CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL FOR CONTRACTORS

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ABSTRACT

This thesis explores the implementation of corporate entrepreneurship (CE) to support contractors' business success based on the experiences of contractors in Indonesia. Furthermore, an assessment model was developed to determine the capability of contractors to implement CE; thereby providing a foundation for contractors to develop appropriate corporate strategies to move from their existing level to their target level.

An exploratory research strategy was used to investigate the implementation of CE by contractors. Semi-structured interviews of top managers of contractors in Indonesia have been conducted to explore the experiences of contractors to implement CE. The data was analysed using inductive thematic analysis. A coding process has been carried out to generate themes that will be considered as key factors of CE for contractors. NVivo 10 software has been used to carry out the coding process.

Twenty one key factors of CE for contractors were identified. These key factors are categorised into five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking that have been adopted to explore the implementation of CE in contractors. Furthermore, a Corporate Entrepreneurship Capability Model (CECM) has been developed based on the concept of the Capability Maturity Model (CMM) to assess the capability level of contractors to implement CE.

The expert review approach has been adopted to justify the quality of the CECM. This model was reviewed by ten academics from universities in Indonesia. Then case studies were carried out on three contractors in Indonesia to assess the practical application of the CECM.

This study expands the boundaries of construction management and entrepreneurship theories for new areas of research and opens broad opportunities for further study. The study also offers contractors a reference to implement CE as well as a tool to assess their entrepreneurial orientation in order to have a foundation from which to develop a strategy that supports their business success.

Keywords: corporate entrepreneurship, capability model, contractor, thematic analysis

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Chapter 1 - INTRODUCTION

1.1 BACKGROUND AND JUSTIFICATION FOR RESEARCH

The construction industry has been considered as an industry that drives a country's social and economic establishment (Ritz, 1994, Halpin and Woodhead, 1998, Levy, 2002, Wong et al., 2010, Winch, 2010). It is the industry responsible for providing and maintaining physical assets which are beneficial to the nation to achieve social and economic goals (Gann and Salter, 2000, Winch, 2010). In countries such as USA, construction is a large and vital sector of that country's economy (Halpin and Woodhead, 1998, Levy, 2002); in Europe, it is the largest industrial employer (Barrett et al., 2008). The role of the construction industry to drive a country's social and economic establishment is increasingly important in many rapidly developing countries (Winch, 2010).

Similar to other developing countries, the construction industry in Indonesia plays an important role in the development of the nation's economy, society and culture. Widjajanto et al. (2011) identified the gross domestic product (GDP) growth for the construction sector has always been above the average GDP growth for all sectors. The Bureau of Indonesian Statistics reported the GDP of the construction industry in Indonesia since 2010 to 2014 made a contribution of about 10 percent per year to the GDP total. Based on the data from The Ministry of Manpower and Transmigration Republic of Indonesia, in 2015, construction industry employs in excess of 7.72 million labourers. The Central Bank of Indonesia in 2010 reported that the value of construction completed has increased year by year since 2000, making the construction industry one of the most attactive and promising in Indonesia (Pamulu, 2010, Widjajanto et al., 2011).

The construction industry involves many different types of companies such as contractors, sub-contractors, consultants and suppliers. In Indonesia, the Act of Republic of Indonesia 18 / 1999, about the construction service, differentiates companies providing construction service into three types: contractors, design consultants and supervision consultants. Among these various types of companies, contractors run their activities in many unique ways. Contractors are project based firms

(PBFs) that deliver a unique end product specifically designed to meet the client's needs. Contractors are characterised by a temporary project's organization within the permanent firm's organization (Gann and Salter, 2000, Barrett and Sexton, 2006, Blindenbach-Driessen and van den Ende, 2006, Dvir et al., 2006, Bosch-Sijtsema and Postma, 2009). In carrying out their activities, contractors need to manage both business and project, constantly considering their different characteristics. Business processes involve repetitive activities while projects usually involve temporary and unique activities (Gann and Salter, 2000). Volpe and Volpe (1991) identified two main challenges that need to be overcome in order to be successful in contractors' business: to beat the competition to get the project and to deliver the project successfully.

A project is considered temporary because it results in an end product which is unique in function, appearance and location. Therefore, it needs to have a specific design and to be carried out a specific method of construction, in order to meet the client needs (Ritz, 1994, Halpin and Woodhead, 1998, Gould and Joyce, 2009). To deliver the project successfully, contractors have particular challenges to deal with, such as maintaining a good relationship with the clients who are actively involved in construction process (Nam and Tatum, 1997), and bringing together numerous independent and diverse companies to achieve one goal: successful project completion (Levy, 2002, Barrett et al., 2008, Gould and Joyce, 2009).

Due to the nature of the industry and the challenges associated with it, contractors have been considered as companies in an environment of high competition, high risk, and high need for innovation (Dvir et al., 2006, Schaufelberger, 2009). However, Chinowsky (2001) points out that contractors in many ways tend to apply a prudent and conventional management style in their business, whereas to achieve long term success, contractors need to implement the right strategic concept, which may involve novelty and innovation.

Problem arises in the construction industry in Indonesia due to the unpreparedness of the construction companies, including contractors, to deal with current conditions and future prospects. The Bureau of Indonesian Statistics reported that, from 2010 to 2013, the number of local contractors in Indonesia was approximately about 130,000. Most of these are small and medium sized contractors with only about 2% being large scale contractors. According to Wirahadikusumah and Pribadi (2011) the majority of these contractors offer only poor to fair performance,

whereas about 100 contractors can be considered excellent, delivering high standards and quality of work in their projects. In these circumtances, local contractors should be wary because the world is in the era of globalization; foreign contractors can easily enter the Indonesian construction market. In 2013, 302 foreign contractors have been registered in Indonesia. This number is not balanced by the number of local contractors who are working overseas. Considering the specific nature and challenge of the contractor business in general and the particular circumtances of construction industry in Indonesia, a strategic effort needs to be made by the contractors of Indonesia, in order to impove their competitiveness and performance (Pamulu, 2010).

Over the last few decades entrepreneurship has become a very popular, phenomenon, widely discussed among people around the world (Carland et al., 1984, Hebert and Link, 1989, Lumpkin and Dess, 1996, Collins et al., 2004, Yalcin and Kapu, 2008, Spencer et al., 2008). Entrepreneurship is considered as an important driving force for business success (Covin and Slevin, 1991, Lumpkin and Dess, 1996, Wiklund and Shepherd, 2003)

Many practitioners and scholars have considered entrepreneurship as an important issue and given serious and deep attention to it (Luchsinger and Ray Bagby, 1987, Hebert and Link, 1989, Sharma and Chrisman, 1999, Lazear, 2005, Yalcin and Kapu, 2008, Fayolle et al., 2010). Consequently, many research efforts on entrepreneurship have been developed rapidly, changed significantly and spread widely in a variety of disciplines, such as history, management, psychology, sociology and economics (Hebert and Link, 1989, Schendel, 1990, Gartner et al., 1992, Moon, 1999, Sexton and Landstrom, 2000, Hoskisson et al., 2011, Brandstätter, 2011). The boundaries of entrepreneurship have been expanded; it is no longer confined to only related to individuals creating a new venture but also to existing companies and to the people who are involved in the businesses processes on a daily basis (Luchsinger and Ray Bagby, 1987, Jennings and Lumpkin, 1989a, Covin and Slevin, 1991, Lumpkin and Dess, 1996, Lumpkin and Dess, 2001, Antoncic and Hisrich, 2003).

Furthermore corporate entrepreneurship (CE) has been considered as a strategy of the established firms to enable them to survive the competition (Guth and Ginsberg, 1990, Covin and Slevin, 1991, Ireland et al., 2009, Özdemirci, 2011, Peltola, 2012). Research on CE has been carried out in a variety of industries such as manufacturing (Zahra and Covin, 1995, Antoncic and Scarlat, 2005, Wiklund and Shepherd, 2005,

Zahra and Garvis, 2000, Mohamad et al., 2011), chemicals (Zahra and Covin, 1995), service (Antoncic and Scarlat, 2005, Wiklund and Shepherd, 2005), trade (Antoncic and Scarlat, 2005), retail (Wiklund and Shepherd, 2005), life insurance, information technology (van Wyk and Adonisi, 2012), high technology (Hughes and Morgan, 2007), and the electrical and electronic industries (Frank et al., 2010). van Wyk and Adonisi (2012) suggested that the model of CE cannot be generalised to all business sectors and all countries around the world. Therefore, studies focused on specific business sectors and in specific countries, such as Indonesia, are needed to explore CE and to devise specific strategies and tactics to nurture and enhance it.

Considering the need of contractors to implement the right strategy to counter the high levels of competition in the market, and the reliability of CE in supporting the success of business, it was established that contractors in particular, are most in need of adopting a CE strategy to ensure business success and survival: more than other types of construction companies.

Although CE is considered as an important strategy for contractors, there is very little research effort directed towards entrepreneurship for and in contractors. Entrepreneurship focused research into construction management was limited to the individual level and was directed towards identifying the personal characteristics of an entrepreneur, an enterprise very similar to research into the concepts of 'leadership' (Abdul-Aziz and Wong, 2010, Sidek and Zainol, 2011, Jaafar et al., 2014). No research on CE has been found in construction management research so far although the dimensions of CE have been investigated individually. Therefore this current research will focus on bridging this gap in research by exploring CE in contractors. Attention on the particular circumstances of the construction industry in Indonesia will characterise this study, because the data is gathered from, and based upon, the experiences of contractors in Indonesia.

Furthermore, in order to develop the corporate strategy based on the CE concept, contractors need to understand both the existing and the target entrepreneurial characteristics of their company. Then a strategy can be developed to fill the discrepancy between the two sets of targets. So far, the model for assessing CE has not been developed in a comprehensive manner. Most models are directed to measure CE level in order to find the correlation between CE level and a company's performance. This study will focus on developing a model for the assessment of the entrepreneurial

characteristics, hence the entrepreneurial orientation, of contractors. Figure 1-1was prepared to show the justification of this research.

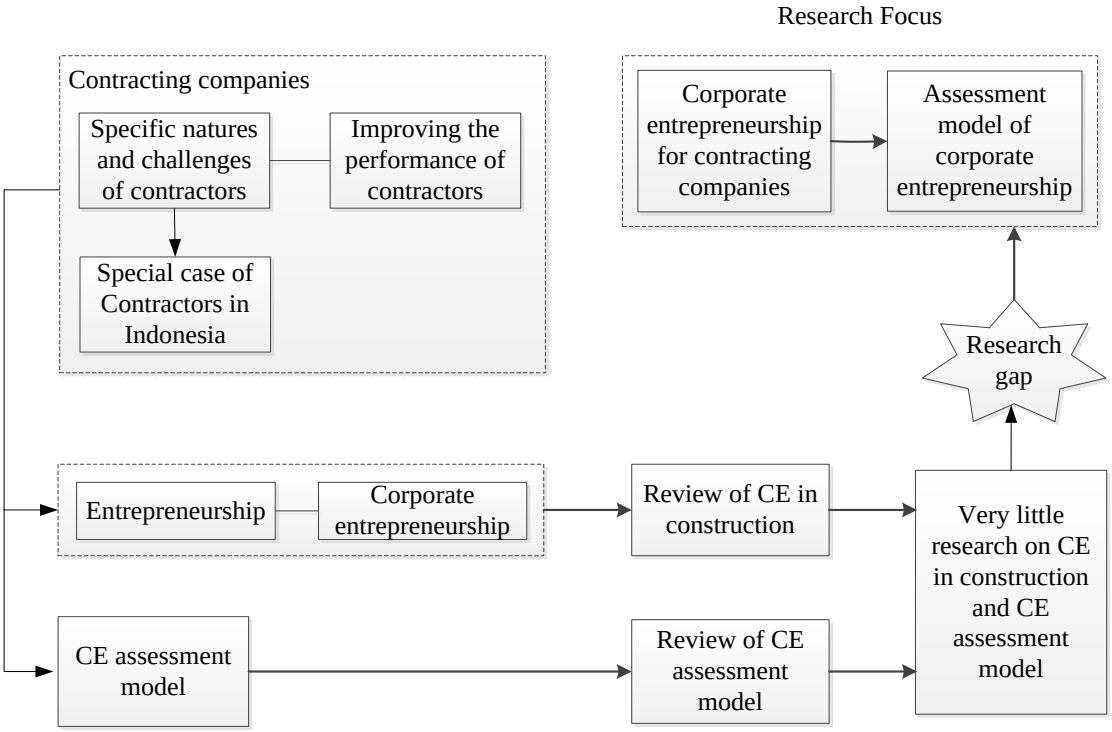


Figure 1-1Research justification

1.2 RESEARCH AIM AND OBJECTIVES

This study is aimed at investigating and developing a model of CE for assessing the capability level of contractors with specific focus on contractors in Indonesia. The specific research objectives to achieve this aim are:

1. to explore theoretical concepts and previous work on entrepreneurship with a specific focus on CE in construction and contractors,
2. to identify the key factors of CE for contractors,
3. to develop a Corporate Entrepreneurship Capability Model (CECM) for assessing entrepreneurial orientation of contractors and their capabilities,
4. to validate the CECM through an expert review and case study

1.3 RESEARCH METHODOLOGY

The research methodology adopted in this study, in order to achieve the research

aim and objectives is a combination of literature review, qualitative technique, model development, case study, and evaluation. These methods will be discussed in detail in Chapter 3 but in this section they are briefly outlined to provide some context.

The literature review was carried out to explore the theoretical concept of entrepreneurship and its related issues both in general context and in construction. A thorough examination has been done regarding several issues related to entrepreneurship, entrepreneurs, CE, intrapreneurs and their characteristics or dimensions. Further and deeper reviews were done for CE and its dimension as a focus of this study. The concept of CE, both in general context and in the particular field of construction has been explored. In particular, the condition of the construction industry in Indonesia was reviewed in order to provide the snapshot of the conditions that are likely affect the results of this study. The reviews were mainly based on secondary data sources, such as journal articles, books and reports.

In order to investigate the implementation of CE in contractors, this study adopts research methods as appropriate for each research stage. Qualitative method was adopted in order to investigate key factors of CE. For this step, data was collected through semi structured interviews of top contractor managers in Indonesia. Thematic analysis with 'bottom up' approach is used to develop key factors of CE. NVivo 10 software is used to carry out the coding process during analysing of the data from interviews.

The CECM is developed to assess entrepreneurial characteristics of contractors based on the Capability Maturity Model (CMM) approach. Finally the CECM was evaluated using two methods: expert review and case study. The model was reviewed by experts to ensure that the model is applicable and appropriate for contractors and that it meets their needs. Then case studies of 3 big contractors in Indonesia were carried out to examine the practical application of the model.

Schema that describes the stages of the research in this study can be seen in Figure 1-2.

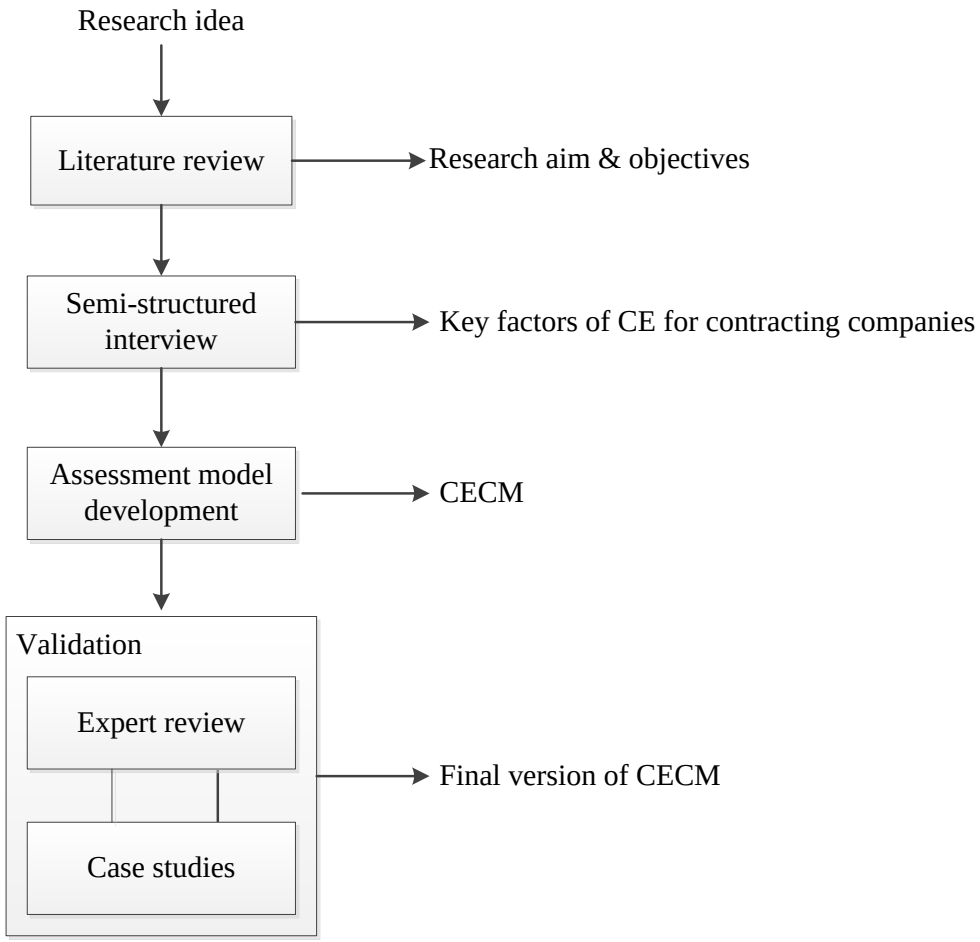


Figure 1-2 Research stages and processes

1.4 THESIS OUTLINE

This thesis consists of eight chapters which are briefly described as follows:

- Chapter 1 provides an overview of the whole study, including background and justification for research, followed by detail of the research aim and objectives, the selected research methodology, and finally an outline of the thesis.

- Chapter 2 explores theoretical concepts and previous work on entrepreneurship. It starts with reviewing definition of entrepreneurship both at individual and corporate level, followed by identifying the characteristics or dimensions of entrepreneurship at both individual level and corporate level. The chapter continues with a review of CE frameworks and their relationship to a company's performance. Because this study focused on CE in construction with a special study in Indonesia, therefore the review was continued in order to explore the implementation of CE in construction and the particular circumstances of the construction industry in Indonesia. Finally this chapter concludes with a

presentation of the previous work on CE assessment.

- Chapter 3 focuses on research design and research methodology. This chapter begins with discussing the research philosophy and approach followed by research methods adopted in this study. Detailed discussion about sample, data collection, data analysis and model validation are explained in this chapter.

- Chapter 4 presents key factors of CE for contractors to take into account, based on the experiences of contractors in Indonesia. It first explains the data collection and analysis process employed to identify the key factors and then presents the key factors and their further explanation, as well as the relationship among those key factors.

- Chapter 5 explains CECM which consists of overview of CMM as a reference point for CECM. Then the process of CECM development is described and finally the matrix of CECM is examined. In addition, this chapter also explains the assessment process that is used to implement the model to assess capability level of contractors.

- Chapter 6 focuses on expert review to validate the CECM. This chapter starts with an explanation of the expert review process adopted to validate the CECM in this study. Finally the result of the expert review is explained as well as some changes that are made to the model as a result of the review.

- Chapter 7 focuses on three case studies which examine the practical application of the model. This chapter explains how the process of case studies is carried out and how the result of case studies are analysed. The results of the analysis of the data, from each of the three case studies, are explained and discussed. Finally the findings of the case studies, with respect to validation of CECM, are presented.

- Chapter 8 summarises the research, then presents an evaluation of the results relative to the initial aim and objectives of this study. Contribution of this study to knowledge as well as its practical implication are drawn and the limitations of the research are identified. Finally recommendations for further studies are made.

These chapters was arranged so as to follow the processes and stages adopted in this study. Figure 1-3 displays a comprehensive picture of the content of this thesis and the

overall research process that has been conducted.

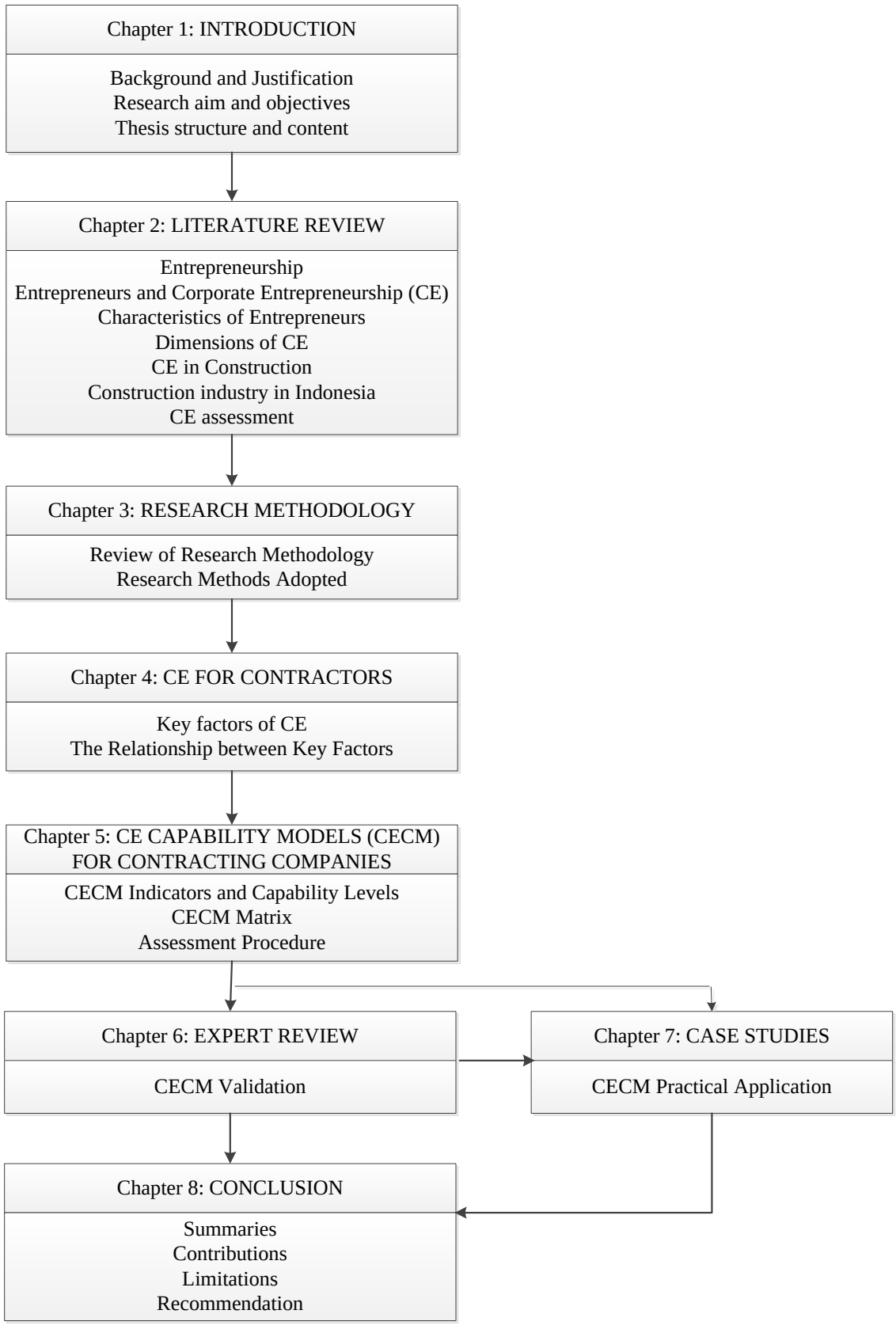


Figure 1-3 Thesis content

Chapter 2 - ENTREPRENEURSHIP

2.1 INTRODUCTION

This chapter presents the results of the literature review which was focused on the general concept of entrepreneurship and its application in construction. The chapter begins by exploring the meaning of entrepreneurship to obtain a deeper understanding of the concept of entrepreneurship and its related aspects; followed by identifying the characteristics or dimensions of entrepreneurship.

Further reviews are more focused on CE which is the focus of this research. Existing frameworks that explain the relation between CE and a company's performance were reviewed to determine the influence of CE on business success. A particular review of CE in construction was carried out to obtain an idea of how CE has been implemented in that field of business; followed by an investigation into the specific condition of construction industry in Indonesia where the data is collected. Finally, models that have been used to assess the entrepreneurial orientation of companies are examined.

2.2 ENTREPRENEURSHIP

Entrepreneurship is derived from word 'entrepreneur' defined in the Longman English Business Dictionary as 'someone who starts a company arranges business deals and takes risk in order to make a profit'. This definition shows that an entrepreneur is associated with people. If an entrepreneur is associated with people then entrepreneurship is associated with activities linked to being an entrepreneur (Collins Cobuild English Dictionary). Entrepreneurship has become very popular; a phenomenon that is widely discussed among people around the world (Carland et al., 1984, Hebert and Link, 1989, Lumpkin and Dess, 1996, Collins et al., 2004, Yalcin and Kapu, 2008, Spencer et al., 2008) because it is considered as an important driver of business success (Covin and Slevin, 1991, Lumpkin and Dess, 1996, Wiklund and Shepherd, 2003). Many research efforts into the subject of entrepreneurship have been made, as the topic under investigation developed rapidly, changed significantly and spread widely.

Despite the numerous studies of entrepreneurship, the coherent and holistic theoretical underpinning of the concept of entrepreneurship is still lacking. Furthermore, there is a lack of consistency among the meanings and patterns of entrepreneurship. It is still the concern of many scholars around the world to find one consistent and acceptable meaning of entrepreneurship (Gartner, 1988, Jennings and Lumpkin, 1989b, Hisrich, 1990, Lumpkin and Dess, 1996, Sharma and Chrisman, 1999, Moon, 1999, Collins et al., 2004, Stewart and Roth, 2007, Dodd and Anderson, 2007, Spencer et al., 2008).

When the discussions on entrepreneurship, published in books and journal papers, are investigated, two dominant and phenomenal paradigms of entrepreneurship are revealed: Schumpeter's paradigm and Kirzner's paradigm. The Schumpeterian classical paradigm is based on a disequilibrium model which places emphasis on entrepreneur as pioneer who takes radical action (Schumpeter, 1939). In contrast Kirzner (1997) introduces the equilibrium model, in which the important feature of an entrepreneur is the ability to find the opportunity that is not recognized by other people. Although Schumpeter and Kirzner have different understanding on entrepreneurship, their opinions need not be seen as contrasting or in conflict. Many scholars agreed that the two paradigms are complementary to each other and that both of them can be applied simultaneously (Hoskisson et al., 2011, Volberda, 1998)

There are many other definitions of entrepreneurship, other than these two dominant paradigms. When all of these definitions are investigated, it is observed that entrepreneurship is focused either on action or process (Hebert and Link, 1989, Jones and Butler, 1992, Lumpkin and Dess, 1996, Sharma and Chrisman, 1999, Bolton and Thompson, 2004, Lazear, 2005, Yalcin and Kapu, 2008, Brandstätter, 2011). According to the Collins Cobuild Dictionary, action is something done on a particular occasion to achieve a particular purpose, while process is series of actions directed to achieve a particular result. Regarding these definitions of action and process, this study considers process is more appropriate to describe entrepreneurship rather than action. Entrepreneurship is directed to business success, and in order to achieve business success, several processes are needed to be carried out.

Entrepreneurship is associated to the process that has been carried out by an individual (Hebert and Link, 1989, Sharma and Chrisman, 1999, Bolton and Thompson, 2004, Brandstätter, 2011) as well as the process within a company (Jones and Butler,

1992, Lumpkin and Dess, 1996, Lazear, 2005, Yalcin and Kapu, 2008). Another issue that is related to entrepreneurship is that of creating new business (Yalcin and Kapu, 2008) as well as maintaining existing business (Jones and Butler, 1992, Lazear, 2005) or of both of creating new business and maintaining existing business (Hebert and Link, 1989, Sharma and Chrisman, 1999, Lumpkin and Dess, 1996, Bolton and Thompson, 2004). Regarding to a specific identifier of a process, several factors are considered as characteristic of entrepreneurship, such as seeking opportunity (Jones and Butler, 1992), risk (Hebert and Link, 1989), creativity (Hebert and Link, 1989, Jones and Butler, 1992, Bolton and Thompson, 2004, Brandstätter, 2011) and innovation or newness (Lumpkin and Dess, 1996, Sharma and Chrisman, 1999, Lazear, 2005, Brandstätter, 2011).

Based on this review entrepreneurship was initially considered as a process of an individual creating and / or then running a business. Later this concept evolved to recognise the process within the company of attempting to gain new business and / or to manage the existing business with the aim to achieve business success. The entrepreneurial process involves several specific characteristics, such as seeking opportunity, risk taking, creativity, and innovation. These characteristics will be discussed in more detail in the following sections. To provide a clear picture about the concept of entrepreneurship, Figure 2-1 has been developed.

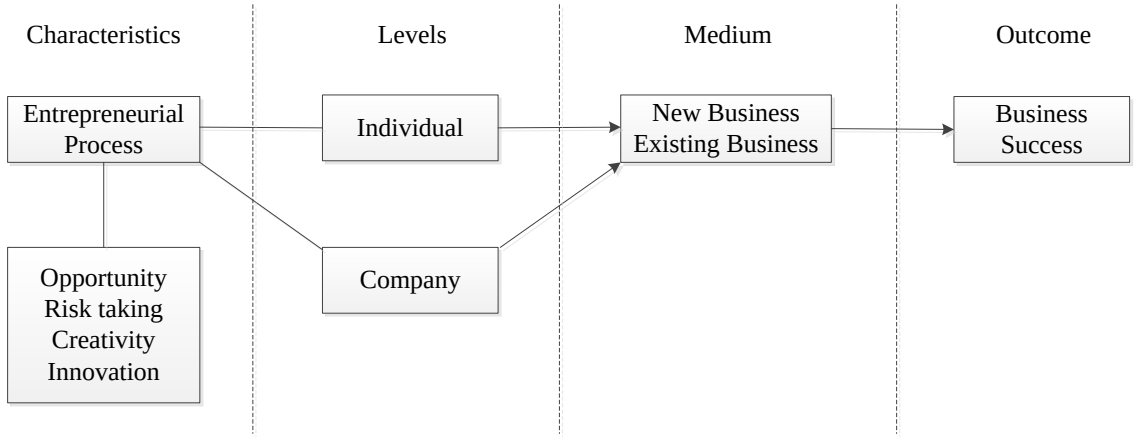


Figure 2-1 Concept of entrepreneurship

2.3 ENTREPRENEURSHIP AT DIFFERENT LEVELS

Regarding the concept of entrepreneurship that has been discussed above,

entrepreneurship can be implemented both at individual and organizational levels. At the individual level, entrepreneurship is associated with entrepreneurs or persons who run their own business (Brockhaus, 1980, Hebert and Link, 1989, Sharma and Chrisman, 1999, Luchsinger and Ray Bagby, 1987, Lazear, 2005, Bolton and Thompson, 2004, Baron, 2007). Intrapreneurs on the other hand, are persons who work for a company (Burgelman, 1983b, Pinchot, 1986, Ross, 1987, Thornberry, 2006, Srivastava and Agrawal, 2010, Martiarena, 2013). Brockhaus (1980) distinguishes entrepreneur from intrapreneur by asserting that an entrepreneur is not an employee. Entrepreneurship at organizational level, has been considered as CE (Burgelman, 1983a, Burgelman, 1984, Jennings and Lumpkin, 1989b, Guth and Ginsberg, 1990, Schendel, 1990, Sharma and Chrisman, 1999) as has intrapreneurship (Kuratko et al., 2005, Hisrich, 1990, Antoncic and Hisrich, 2003). Figure 2-2 presents types of entrepreneurship at different levels.

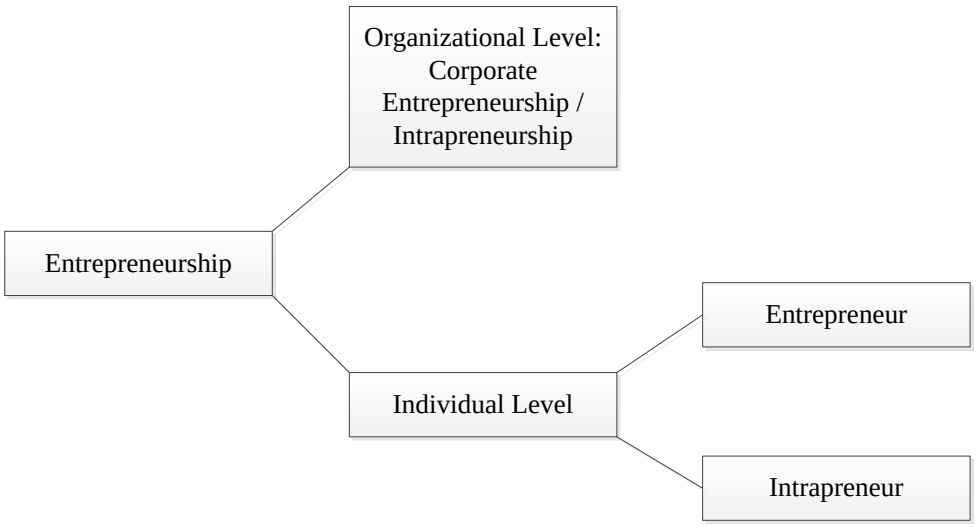


Figure 2-2 Types of entrepreneurship

2.3.1 Entrepreneur

When the definitions of entrepreneur were investigated, it was found that an entrepreneur is a person who is the owner and manager of a business (Brockhaus, 1980). More than owning and managing a business, the entrepreneur is also considered as an initiator who establishes a business (Luchsinger and Ray Bagby, 1987, Gartner, 1988, Sharma and Chrisman, 1999, Bolton and Thompson, 2004, Lazear, 2005). In a

particular way, Lazear (2005) also considers an entrepreneur as a leader who brings people together to run a business. The main purpose of entrepreneurs in doing business is profit and business growth (Gartner, 1988, Baron, 2007)

Entrepreneurs are challenged to find business opportunity by discovering or creating and commercializing new goods, new services and new methods (Bolton and Thompson, 2004). In this situation, entrepreneurs are confronted with a risky and uncertain business situation (Luchsinger and Ray Bagby, 1987, Hebert and Link, 1989). Therefore, entrepreneurs are required to be innovative, creative and independent (Luchsinger and Ray Bagby, 1987, Gartner, 1988, Hebert and Link, 1989, Bolton and Thompson, 2004, Lazear, 2005).

Based on several meanings of entrepreneur have been revealed in the review, this study considers entrepreneurs as people who own and manage a business to achieve the principal purposes of growing the enterprise in order to profit from it. Such people are, but not always, the initiators who start the business. In running a business, they are challenged to find business opportunities under risky and uncertain conditions; therefore they are required to have particular characteristics such as being innovative, creative and independent: they are not afraid to be seen as 'different'.

2.3.2 Intrapreneur

Entrepreneurship at the individual level has been evolved from the entrepreneur who is the owner of a business. The point was discussed in the previous section that the status and situation of an entrepreneur differs from people working for a company. People who are working for a company are required to have the skills and character of an entrepreneur but they are limited by company's boundaries (Luchsinger and Ray Bagby, 1987, Ross, 1987, Altinay, 2005, Thornberry, 2006, Srivastava and Agrawal, 2010). The latter personnel have been named as intrapreneurs.

Intrapreneurs have a significant role to play in the development of their company (Altinay, 2005). Related to this issue, (Burgelman, 1983a) argued that the ideas of entrepreneurs to renew 'the organization' will subsequently be implemented by the lower managers and then by the members of staff. Intrapreneurs, it has been argued, can contribute to the development of a company in several ways such as promoting innovation (Luchsinger and Ray Bagby, 1987, Ross, 1987) and by corporate venturing

(Luchsinger and Ray Bagby, 1987, Burns, 2005).

Even though both entrepreneurs and intrapreneurs contribute to the development of a company, and are required to have similar skills and characteristics, they differ from each other in several ways such as the way they handle or are affected by reward, risk, skills and independent action. Intrapreneurs' reward are found mainly is their salaries, which are regular and controllable compared to entrepreneurs' rewards in the form of financial income that is more independent and can be adjusted accordingly. Entrepreneurs bear high individual risk that can result in significant outcomes for the organization including bankruptcy, while intrapreneurs share any risk with the parent company and the effect of risk is mainly only related to the individual's reputation and career. Entrepreneurs can set goals independently and can control their own work environment, while intrapreneurs must consider and follow company boundaries. In these particular conditions, entrepreneurs are required to have higher entrepreneurial skills compared to intrapreneurs (Luchsinger and Ray Bagby, 1987, Ross, 1987, Christensen, 2005, Martiarena, 2013). The comparison between the situation of entrepreneurs and intrapreneurs, based on the above issues, is presented in Table 2-1.

Based on several meanings of intrapreneur have been revealed in the review, this study considers intrapreneurs (also and more commonly known as employees) as individuals who work for the company. Their territory is confined to within the company boundaries but they need to have and to implement entrepreneurial skills in order to make a contribution to the company is development.

2.3.3 Corporate entrepreneurship

CE can be considered as entrepreneurship that is implemented in the existing organization or company. This simple definition is similar to the definition that was delivered by Antoncic and Hisrich (2003) and Burns (2005). Other studies have particularly associated CE with several activities within an organization or company. CE has been considered as an activity taking place within a company to create new business (Burgelman, 1983a, Burgelman, 1984, Guth and Ginsberg, 1990, Schendel, 1990, Sharma and Chrisman, 1999). In particular way, Burgelman (1983a, 1984) explained new business creation as 'business diversification to a new business area which is unrelated to, or only has limited relation with, the existing business. Guth and Ginsberg

(1990)and Zahra (1993, 1995, 1996) associated the creation of new business with innovation and venturing.

Table 2-1 The different situations of entrepreneur and intrapreneur (Luchsinger and Ray Bagby, 1987, Martiarena, 2013)

Aspects	Entrepreneur	Intrapreneur
Reward	Independence and expected financial income, other rewards such as pride, satisfaction, etc.	Regular and controllable payment, other rewards such as award and recognition, etc.
Risk	Mainly individual financial risk that resulted a fatal effect, such as bankruptcy	• Mainly reputational and career development risk • Shared financial risk with the parent company
Independency	Independent in setting the goal and able to control their own environment	Working within the setting of established company
Skills	Higher entrepreneurial skills	Lower entrepreneurial skills, combining with managerial skills

Instead of creating new business, CE is also directed to organizational renewal, such as new products and new market development (Jennings and Lumpkin, 1989b), strategic renewal (Guth and Ginsberg, 1990, Zahra, 1993, Zahra and Covin, 1995, Zahra, 1996, Sharma and Chrisman, 1999), and creating a strategy to transform a stagnant business (Schendel, 1990).

In order to provide a better understanding about CE, an entrepreneurial company will be compared to a non-entrepreneurial or conservative company. Miller and Friesen (1982) compared entrepreneurial to conservative company in term of innovation. They assumed that a conservative company develops innovation in order to respond challenges and demands. In contrast, entrepreneurial company, by definition, creates a high demand for innovation so it is aggressively developed. Jennings and Lumpkin (1989b) found that compared to conservative company, an entrepreneurial company

tends to use a more participative approach rather than an unilateral approach and decision making relies more on competent and creative persons. Therefore members of entrepreneurial companies are more innovative and take greater risks in order to bring an idea to reality.

Based on several meanings of CE have been revealed in the review, this study defines CE as entrepreneurial activities or processes within an existing organization designed to renew on-going business or to create a new business or businesses.

2.4 THE DIMENSIONS OF ENTREPRENEURSHIP

The nature of entrepreneurship can be more accurately understood through identifying its characteristics or dimensions. The characteristics are distinguished for entrepreneurship at both individual and organizational levels. Then the characteristics at the individual level between entrepreneur and intrapreneur are distinguished. All characteristics or dimensions are reviewed and investigates further in the following sections.

2.4.1 Characteristics of Entrepreneurs

Over the years, studies of various characteristics of entrepreneurs have been widely carried out. Koh (1996) investigated six psychological characteristics of entrepreneurs which are the most frequently cited in the previous similar studies. Those characteristics are: need for achievement, internal locus of control, propensity to take risk, tolerance of ambiguity, self-confidence and innovativeness. In addition to these six characteristics, Tajeddini and Mueller (2009) includes need for autonomy. They found autonomy is one of entrepreneur's needs and this need is higher than people in general. Sidek and Zainol (2011) used three of these characteristics: need for achievement, risk taking propensity and internal locus of control in their research that linking psychological traits of entrepreneur and business performance.

Burns (2005), in order to determine the characteristics of an entrepreneur, he distinguished entrepreneur from owner-manager; because he argued not all owner-managers can be considered as entrepreneur. In running the business, an owner-

managers tend to focus on surviving, while entrepreneurs have a desire to grow in addition to survive.

In this situation, the characteristics of entrepreneur have been split into two categories: the first is related to their survival instinct and the second is related to their growth instinct. The first category is considered as the characteristic of an entrepreneur as well as an owner-manager, while the second category is found particularly in the entrepreneur. The shared characteristics of owner-manager and entrepreneur, that are considered as survival instintct are: need for independence, need for achievement, internal locus of control, ability to live with uncertainty and take measured risks. In addition, the specific characteristics of an entrepreneur that are considered as growth related are: opportunistic, willingness to take greater risks, innovative, self-confident, proactive and decisive with high energy, able to live with greater uncertainty, self-motivated, having vision and flair. These characteristics are considered as inborn characteristics that can be improved by the learning process, experience, environment and culture.

Frese (2009) described the personality characteristics of entrepreneurs as embracing risk taking, innovativeness, need for achievement, internal locus of control, proactive personality, stress tolerant, and with passion for work. These characteristics, together with human capital and environment factors, can support the active performance of the entrepreneur to achieve success.

After reviewing all of these characteristics, it was found that some characteristics have similar meanings but are identified by use of different terms or words, for example propensity to take risk (Koh, 1996, Tajeddini and Mueller, 2009) is similar to willingness to take greater risk (Burns, 2005) as well as risk taking (Frese, 2009). Some characteristics can be considered as a part of other characteristics, for example passion for work (Frese, 2009) can be considered as a part of need for achievement (Koh, 1996, Tajeddini and Mueller, 2009, Frese, 2009).

Finally this study considers eight characteristics that distinguish people who have entrepreneurial tendencies from those who do not. The eight characteristics are: risk taking, innovativeness, need for achievement, internal locus of control, self-confident, tolerance of ambiguity, need for autonomy and proactiveness. All of these characteristics are explored further in the following section.

2.4.1.1 Risk taking

Risk taking refers to a tendency to take an opportunity which required decision making under uncertain conditions (McClelland, 1961, Koh, 1996). In particular McClelland (1961) emphasized that an entrepreneur's risk taking must be distinguished from the behaviour of gambler. The entrepreneur takes a risk under controllable circumstances, therefore the risk taking behaviour of entrepreneurs is considered as calculated risk taking, which involves not only luck but skill as well. Sidek and Zainol (2011) found higher performance entrepreneurs have a higher propensity to take bold risk taking action compared to lower level performers.

2.4.1.2 Innovativeness

Burns (2005) considers an entrepreneur's ability to create innovation as one of two most important characteristics of entrepreneurs; the second major characteristic is being opportunistic. However, innovation is needed in order to create and to exploit opportunity. Frese (2009) defined innovativeness as creating and implementing new ideas such as new product, new service, new system or new strategy in order to achieve success of the company. He considered innovativeness is related to self-starting, although they are different. Innovation is an important aspect of self-starting because self-starting is contrary to imitating what has already been done by others.

2.4.1.3 Need for achievement

Need for achievement is related to the ambition of individuals to achieve their goal rapidly and perfectly. This ambition motives the individual to defeat all constraints that prevented the goals from being reached (Tajeddini and Mueller, 2009). According to McClelland (1961) entrepreneurs are characterized by high need of achievement. Sidek and Zainol (2011) found that the higher the need of achievement, the higher the entrepreneurs' performance. Burns (2005) mentioned achievement levels may vary depending on the individual but an entrepreneurs' achievement is usually associated with money.

2.4.1.4 Internal locus of control

Locus of control is related to an individual's beliefs about who or what controls the actions and achievement of his or her life. This characteristic is distinguished into internal and external locus of control. People with an internal locus of control tend to

assume that his or her behaviour is under his or her control; they take responsibility for their actions. Those people with an external locus of control tend to assume that his or her achievement is influenced by external factors and so that individual has little or no control over the outcome of their actions. The entrepreneur is characterised by having an internal, rather than external, locus of control personality, as do many successful people in a range of professions (Koh, 1996, Tajeddini and Mueller, 2009). According to Frese (2009) an internal locus of control makes people feel competent to achieve their expected goal or goals. Sidek and Zainol (2011) found internal locus of control is positively related to positive entrepreneurial performance.

2.4.1.5 Self-confident

Uncertainty is the nature of entrepreneur's circumtances; Burns (2005) claims that, in order to deal with uncertainty, people need to be self-confident. Self-confidence is defined as having the conviction of his or her own ability to be able to achieve expected goals (Koh, 1996, Tajeddini and Mueller, 2009). According to Tajeddini and Mueller (2009), self confidence directs people to act properly and effectively in order to be successful.

2.4.1.6 Tolerance of ambiguity

An ambiguous situation exists when the information about that situation is not fully or sufficiently available (Koh, 1996). This situation usually occurs in new and complex situations of high risk and high uncertainty. In many cases, an entrepreneur will need to make a deal in an ambiguous situation. Entrepreneurs who characterised by having a high tolerance of ambiguity, consider this situation as a challenge, not a barrier, and will responded positively in such a situation. The limited information available will be fully utilized to achieve optimal results (Koh, 1996, Tajeddini and Mueller, 2009).

2.4.1.7 The need for autonomy

The need for autonomy has a variety of meanings, depending on the context of discussion; however, when it is associated with the personal need for autonomy, the most suitable definition is personal preference to work and to make decisions independently, free from the influence from outsiders (van Gelderen et al., 2003). Lumpkin and Dess (1996) mentioned that autonomy leads entrepreneurs to have new and great ideas, therefore from these business ideas will emerge. Burns (2005) stressed

that an entrepreneur needs independence in order to control the idea, the goal, the business, to be able to work differently, to reach the potential, etc.

2.4.1.8 Proactiveness.

According to Burns (2005) entrepreneurs must be able to seize opportunities quickly and accurately, they should not just wait for 'good luck'. Frese (2009) added that entrepreneurs should not only be determined and able to seek opportunities but also to anticipate problems that will arise from those opportunities and then to find ways to overcome those problems.

2.4.2 Characteristics of Intrapreneurs

Intrapreneurs have similar characteristics to entrepreneurs but they are working within a company's boundary, therefore they need to combine entrepreneurial skills with managerial skills (Luchsinger and Ray Bagby, 1987, Ross, 1987, Altinay, 2005, Burns, 2005). Similar to entrepreneurs, intrapreneurs need to be risk taker, self-motivated and self-confident (Pinchot, 1986), hardworking, goal or result oriented, and ambitious (Pinchot, 1986, Ross and Unwalla, 1986), as well as comfortable with change (Kanter, 2004).

Contrary to the opinions that intrapreneurs have similar characteristics to entrepreneurs, Martiarena (2013) found that intrapreneurs are more similar to employees, rather than entrepreneurs. Her study found that intrapreneurs are more likely to avoid risks, fail to recognise business opportunities and have poorer entrepreneurial skills. However this finding was based on a particular situation: in her research, intrapreneurs are associated with corporate venturing activities within the boundaries of an existing company.

In addition to entrepreneurial skills, intrapreneurs are required to have managerial knowledge and skills such as organization theory, conflict resolution (Ross and Unwalla, 1986), management style (Kanter, 2004), the bureaucratic system, sales and marketing (Pinchot, 1986), team work (Burns, 2005). Furthermore, in order to address the entrepreneurship spirit within the company boundary, intrapreneurs must be able to minimize constraints from the organizational structure and system (Luchsinger and Ray Bagby, 1987), in order to create and maintain a working culture and

environment supporting the spirit of entrepreneurship (Ross, 1987).

2.4.3 Dimensions of Corporate Entrepreneurship

Miller (1983) shifted the view about entrepreneurship from an individual effort onto the company's efforts. Along with the growing of company size and complexity, entrepreneurial activities of the companies are needed in addition to personal entrepreneurial efforts of persons from within the company. Based on this fact, he highlighted three key aspects needed in an entrepreneurial company: innovativeness; risk taking; and proactiveness.

Furthermore these are the most frequently referred to characteristics in the following studies. Covin and Slevin (1991) reflected those three characteristics as entrepreneurial in a model that they proposed in their paper. In their model, risk taking was considered as a top manager's action when faced with uncertain condition; innovativeness was related to product innovation, and proactiveness was related to a pioneering spirit needed to aggressively compete with the company's rivals.

Several other studies have also used these characteristics. Zahra and Covin (1995) used these three characteristics to measure CE in their study about the impact of CE to the financial performance of a company. Wiklund and Shepherd (2005) measured entrepreneurial orientation (EO) of the company, based on these characteristics, in their research about the influence of entrepreneurial orientation on the performance of small businesses. These characteristics were also used by Frank et al. (2010) to measure EO of small and medium sized enterprises (SMEs), in research that linked EO to business performance in terms of sales and cash-flow growth.

Lumpkin and Dess (1996) considered two other dimensions as important aspects of the entrepreneurial orientation of a company: competitive aggressiveness and autonomy. Accordingly the five dimensions of CE suggested by Lumpkin and Dess (1996) are innovativeness, risk taking, pro-activeness, competitive aggressiveness and autonomy. Competitive aggressiveness was added to complement proactiveness, these two dimensions being closely related to each other and often considered as similar. In fact they are different in one particular dimension (Lumpkin and Dess, 1996, Lumpkin and Dess, 2001). Proactiveness is associated with efforts to secure opportunities, while competitive aggressiveness is more about dealing with competitors in order to gain an

opportunity (Lumpkin and Dess, 2001). Autonomy was added because it was considered as an important aspect to foster an entrepreneurial value within an entrepreneurial company. In the context of CE, autonomy means freedom and independence that are provided to staff to carry out entrepreneurial activities (Lumpkin et al., 2009).

Antoncic and Hisrich (2003) defined eight dimensions of intrapreneurship or CE. These eight dimensions are new ventures, new business, product/service innovativeness, process innovativeness, self-renewal, risk taking, pro-activeness and competitive aggressiveness. Kreiser et al. (2010a) determines the three primary dimensions of CE are innovativeness, pro-activeness and strategic renewal. They suggest firms should be proactive in pursuing favourable business opportunities, innovative to develop new products and processes, and the continuously redefine their activities through the process of strategic renewal, in order to create and exploit opportunities.

After reviewing all of these sets of dimensions, it was decided to adopt the five dimensions of CE as suggested by Lumpkin and Dess (1996): autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking. The justification for chosing these dimensions is because of their comprehensiveness and conceptual clarity. Also some further discussions on these dimensions have been aired regarding the distinction between competitive aggressiveness and proactiveness (Lumpkin and Dess, 2001), and the relationship between each dimension to business performance (Hughes and Morgan, 2007, Hussain et al., 2015). These five dimensions are examined further in the following section.

2.4.3.1 Autonomy

Autonomy is defined philosophically in a personal context as free and independent individual action to make a decision as intended. The concept of autonomy has been expanded beyond individual focus to autonomy in the context of a contemporary organization and corporate autonomy (Roloff and Aβländer, 2010).

Autonomy in the organizational context usually is interpreted as autonomy of employees within the boundaries of a company's rules and culture (Roloff and Aβländer, 2010). Further exploration of autonomy in the context of employee's autonomy found autonomy is referred to as freedom for employees, as an individual or a team to deliver an idea and to realize it thoroughly, as well as to think and to act

independently (Lumpkin and Dess, 1996, 2001, Hughes and Morgan, 2007).

Various types of autonomy that are provided by the company for its staffs have been identified, such as: autonomy to work independently, autonomy to make a decision, autonomy to set their own goals, autonomy to negotiate, freedom to access information, freedom to communicate, and freedom to undertake business opportunity (Covin and Slevin, 1989, Hughes and Morgan, 2007, Tsai et al., 2008, Roloff and Aβländer, 2010). In particular, with the case of decision making, McCall (2001) considered the autonomy of employees to participate in decision making, is a personal right that cannot be denied.

Autonomy may be applied in different ways in different companies because it depends on the type, style, size, culture and ownership of the company. For example, organization size and ownership may imply the level of centralization and delegation, which influence how autonomy is provided to the staff (Lumpkin and Dess, 1996, 2001).

Autonomy is also applied for internal corporate ventures or to subsidiaries of the company. Johnson (2012) suggests two major types of autonomy in the context of internal corporate ventures: structural autonomy and planning autonomy. Structural autonomy related to the independent operation of a new business unconnected to the existing business units, while planning autonomy addressed independent planning and control, such as goals and strategy setting and progress evaluation. In the particular case of the relationship between headquarters and subsidiaries, Homburg and Prigge (2014) found subsidiaries usually expect more autonomy than that provided by their company's headquarters.

Furthermore Roloff and Aβländer (2010) discovered corporate autonomy is needed when a company, as a legal entity, needs autonomy to make a deal with another organization, for example in the case of the relationship between buyer and supplier. The issue of corporate autonomy was less frequently used and discussed than individual autonomy although the term of autonomy is commonly used to describe the regions and nations' freedom and independency.

In addition to autonomy as an aspect of independence, autonomy has also been considered as one of the dimensions of entrepreneurial orientation. As such a dimension, Lumpkin et al. (2009) argued that autonomy is an important aspect for any

entrepreneurial company in order to create entrepreneurial value, because autonomy provides the chance for the staff to carry out entrepreneurial activities within the company. In accordance with this opinion, Srivastava and Agrawal (2010) considered autonomy as a characteristic of CE that provides the freedom for staff to be innovative.

2.4.3.2 Competitive aggressiveness

Competitive aggressiveness has been considered as a company's efforts to outperform its competitors directly and vigorously (Lumpkin and Dess, 1996). Competitive aggressiveness is characterized by reactions or responses to competitors' action as well as exploiting the strength of the company compared to its competitors (Lumpkin and Dess, 1996, Helfat, 1997, Lumpkin and Dess, 2001). A competitive aggressive company will continuously assess the condition of its competitors, therefore the weaknesses of its competitors can be identified and its own strength can be featured, hopefully resulting in more opportunities for commercial advantage being obtained (Hughes and Morgan, 2007).

Competitive aggressiveness has been translated into several practical areas, such as aggression in price competitions, introducing innovative products that outperform competitors' products, haunting the competitors in the market, bringing special surprises to the market (Hussain et al., 2015). Particularly Tsai et al. (2008) suggested organizational innovation should be directed to master competitors' strategies, in order to outperform those competitors.

In addition, Lin (2006) proposed that social integration of the top management team members positively influences a company's competitive aggressiveness because this social integration will promote several positive environments and cultures such as better communication, opportunity to share information, better conflict resolution. Ferrier (2001) found that a company's competitive aggressiveness is influenced by the ability of the top management team to observe and to catch hints from the business environment: 'to sense the wind'.

2.4.3.3 Innovativeness

Innovativeness is interpreted as an effort to gather and to support the invention of creative new products, services and processes (Lumpkin and Dess, 1996, 2001, Hughes and Morgan, 2007). Innovativeness of and in a company has been studied in

various contexts such as: supply chain resilience (SCR) (Gölgeci and Ponomarov, 2015) and Total Quality Management (TQM) (Wiengarten et al., 2013).

In the case of a company's SCR, innovativeness has been considered as an antecedent that played an important role in the creation of SCR. The researchers concluded that companies with higher levels of innovativeness have higher chances to establish and to maintain SCR, thereby protecting their commercial well-being (Gölgeci and Ponomarov, 2015). According to Wiengarten et al. (2013), innovativeness has been recognized as similar to, and overlapping with, TQM. The study found the performance of companies was influenced by seven practices of TQM: visionary leadership, internal and external cooperation, learning, process management, continuous improvement, employee fulfilment, and customer satisfaction. The positive influence of TQM was stronger in the companies with higher levels of innovativeness than the lower ones.

Innovativeness was linked to different types of innovations, such as product innovation (Liu and Chen, 2015, Tsai et al., 2015) and service innovation (Dotzel et al., 2013). Product innovativeness was defined as a propensity to introduce innovative product characterised by properties such as newness, uniqueness, pioneering, and technology adoption. Service innovativeness was introduced in order to provide customer satisfaction, meet customers' needs and to improve the firm's value at an acceptable risk.

According to Andersson et al. (2011), product innovation is categorized as 'tangible' innovation while service innovation is 'intangible'. The researchers mentioned that innovation was usually associated with tangible innovation only; however, company innovativeness should be focused on intangible innovation as well as business model innovation, networking and management innovation.

Liu and Chen (2015) found market orientation and technology orientation as the antecedents of product innovativeness, while Tsai et al. (2015) found knowledge integration influenced product innovativeness. The study about service innovativeness has considered both the internet and people as enablers of service innovations. The findings shows that internet innovativeness should be maintained in most industries; however people innovativeness is only needed in human-dominated industries (Dotzel et al., 2013)

In the context of innovativeness as dimension of entrepreneurial orientation,

Joshi et al. (2015) introduced the other two dimensions of entrepreneurial orientation: proactiveness and risk taking as the antecedents of innovativeness. Their study found that both proactiveness and risk taking have a relationship with innovativeness but the influence of proactiveness was in some cases impaired by organizational structure. In other cases however, the organizational structure enhanced the relationship between risk taking and innovativeness.

2.4.3.4 Proactiveness

Proactiveness has been characterized by behaviour that is proactive rather than reactive and more relevant to exploration rather than exploitation (Lumpkin and Dess, 1996, Helfat, 1997, Lumpkin and Dess, 2001). Sandberg (2007) distinguished between reactive and proactive action based on a company's response to customer behaviour. A company can respond to a customer's behaviours in three different ways. First, the company waits until a customer's need has been articulated then tries to understand and satisfy it. This behaviour is considered as reactive response. The second mode of response is by anticipating a customer's future needs and the third way is by influencing customers' behaviour, either directly or indirectly, through several actions such as forming customers' purchasing criteria or introducing new innovative products to the market. The second and the third examples are considered as proactive response.

In the context of a proactive company, proactiveness has been defined in previous research as being ahead of its competitors, mastering customer demand and looking ahead to spot market trend (Miller, 1983, Covin and Slevin, 1989, Hughes and Morgan, 2007, Tsai et al., 2008). Hughes and Morgan (2007) emphasized that a proactive company is characterised by it continuously monitoring the development of the business environment and then taking action prior to its competitors and never waiting for the emergence of external demands. Miller (1983) mentioned that pursuit of new opportunities is continually needed by a company; particularly as it grows and becomes ever more complex. In order to successfully seize an opportunity, a company needs to be a pioneer and not just a competitor's follower in market. In this particular case, therefore, it is stressed that a company be proactive in order to pursue new opportunities.

Proactiveness plays an important role in various circumstances such as radical innovation in order to respond to customers' behaviour (Sandberg, 2007), enhance environmental management in order to gain competitive advantage (Mitra et al., 2008b,

Mitra et al., 2008a), develop supply chain risk management to minimize the chance of suppliers insolvencies (Grötsch et al., 2013), note the public sector's entrepreneurial characteristics to achieve more competitive and more productive environments (Kim, 2010) and explore market expansion to international markets (Dai et al., 2014). Proactiveness has been investigated in various areas such as the public sector (Kim, 2010), family business (De Massis et al., 2014, Craig et al., 2014) and small-medium enterprises (SMEs) (Kreiser et al., 2010b, Tang et al., 2014, Dai et al., 2014)

In order to enhance a company's proactive behaviour, several factors have been considered as an antecedent of proactiveness. Grötsch et al. (2013) studied proactiveness in the context of supply chain risk management (SCRM). To be proactive in SCRM is considered important, because a main cause of supply chain failure is supplier insolvencies. Their study found a management control system; a cognitive style of decision makers and a good buyer-supplier relationship exert a positive impact to be proactive in supply chain risk management, in order to minimize their suppliers' risk or insolvency. The other external factor that influences proactiveness is national cultures (Kreiser et al., 2010b). In this study, national culture values were measured by four dimensions: uncertainty avoidance, individualism, masculinity and power distance. The results show companies that were operating from cultures which are uncomfortable with uncertain conditions, exhibit less proactive behaviour rather than do companies with an opposing view. Meanwhile, masculinity does not influence proactive behaviour.

As a dimension of CE, Tang et al. (2009) found that proactiveness is a leading and primary dimension that encourages and enables the other two dimensions of CE: innovativeness and risk taking. A firm's proclivity for proactiveness will impact innovative and risk taking behaviours to capture opportunities. Later on Kim (2010) found that among the three dimensions of CE, proactiveness was found to be the most influential factor relating to the improvement of public sector performance, rather than innovativeness and risk taking.

Proactive behaviour is not implemented in the same intensity along the life cycle of an organization. For example, aproactive response is not always needed at every stage of a radical innovation process. During the development stage of some radical innovations, the company may behave reactively rather than proactively (Sandberg, 2007). In another case, De Massis et al. (2014) found that, in the life cycle of family

firms, proactiveness declines in the initial stage, then increases, and finally decreases again as the family firms become mature.

2.4.3.5 Risk taking

Risk taking is characterised by a tendency to take bold actions under uncertain condition with uncertain results, in order to achieve the expected results (Lumpkin and Dess, 1996, 2001, Hughes and Morgan, 2007). Miller (1983), Covin and Slevin (1989), and Lumpkin et al. (2009) all found risk taking decisions were usually intended to get high returns. Bold actions taking risks can be addressed to several high risk activities such as venturing, entering unknown new markets and committing to utilize a large portion of the company's resources with uncertain outcomes (Lumpkin and Dess, 2001).

In a particular context, risk taking was considered as a factor that influences companies to expand their international market (Dai et al., 2014), as well as to create innovation (Craig et al., 2014). Risk taking is also considered as a factor that contributes to the improvement of public sector performance (Kim, 2010). Risk taking also has been studied in diverse areas such as SMEs (Kreiser et al., 2010b, Dai et al., 2014), public agencies (Kim, 2010) and family firms (Craig et al., 2014).

Risk taking levels have been found influencing international market scope. A moderate level of risk taking is considered more beneficial than high and low levels because a high level of risk taking increases the stakes needed in order to play in the international market; while low levels impede international market expansions (Dai et al., 2014). In the case of public agencies, Kim (2010) found risk taking contributed positively to the improvement of public agencies performance. However this study also found that risk taking is considered as the most difficult aspect to be implemented in public agencies for legal, political and citizen issues.

Most studies declare that risk taking has a positive effect to companies' performance but Craig et al. (2014) found conflicting results. They examined the impact of risk taking behaviours in family firms and non-family firms on innovation that is measured by the revenue created by product innovation. The results showed only non-family firms get benefit from risk taking, whereas risk taking does not influence the innovative output in family firms. This finding was explained, to some extent, by suggesting a firm's culture was influenced by the owner-manager system existing in family firms. The overlap of ownership and management in family firms results in

decision makers that are more risk averse than risk taking.

Factors that influence risk taking behaviours in various ways can be categorized into corporate governance (Eling and Marek, 2014, Jiraporn et al., 2015, Ding et al., 2015), government affiliation (Ding et al., 2015) and culture (Kanagaretnam et al., 2014, Li et al., 2013).

Corporate governance as an impact factor on risk taking has been elaborated into several variables such as compensation schemes, monitoring from the board of directors and company block holders. It was found that all of these variables create negative energy against risk taking, it means higher compensation compared to the market average, more monitoring by boards of directors and larger number of company block holders decrease risk taking behaviour (Eling and Marek, 2014). Ding et al. (2015) considered incentives and political relations of top executives of the company as major influences of a corporation's risk taking behaviour.

Culture that influence risk taking behaviour has been translated into three indicators: i) individualism, ii) propensity to avoid uncertainty and iii) harmony or attitudes toward change and conflict (Li et al., 2013) while Kanagaretnam et al. (2014) only used two of them in their study: individualism and propensity to avoid uncertainty. Both studies found that individualism contributes a positive impact to risk taking while uncertainty negatively influences risk taking behaviour (Kanagaretnam et al., 2014, Li et al., 2013). As well as uncertainty avoidance, the culturally prescribed value place on harmony also exerts a negative influence on risk taking (Li et al., 2013).

2.5 CORPORATE ENTREPRENEURSHIP AND A COMPANY'S PERFORMANCE

Numerous studies have attempted to consider CE as a key factor of business success. Research on the impact of CE on a company's performance has been carried out in a variety ways. The relationship between CE and company's performance has been integrated in some comprehensive models and it was found that CE influences company performance in various aspects. In order to give a brief overview about the relationship of CE and company performance, six models of CE are reviewed in this section: Covin and Slevin (1991), Zahra (1993), Lumpkin and Dess (1996), Ireland et al. (2009),Özdemirci (2011), and Mohamad et al. (2011).

Covin and Slevin (1991), Zahra (1993) and Mohamad et al. (2011) examined the relationship between CE and a company's performance by adopting three dimensions of CE: risk taking, innovativeness and proactiveness proposed by Miller (1983). These three dimensions of CE have been extended into five dimensions by adding: autonomy and competitive aggressiveness (Lumpkin and Dess, 1996).

Özdemirci (2011) spelt out CE into four dimensions: new business venturing, innovativeness, self-renewal, proactiveness. When these dimensions were examined further, they were seen to be little different from three dimensions that were used in previous studies. In fact new business venturing and self-renewal can be considered as innovativeness as well as proactiveness, in that, they are behaviours that depend on risk taking attitudes.

In a different way, Ireland et al. (2009) did not define company's entrepreneurial orientation through the dimensions of CE. They reflected entrepreneurial orientation of the company through entrepreneurial organization architecture, entrepreneurial processes and entrepreneurial behaviours at the organizational level, top management level and staff level.

The performance of a company, as an output of CE, has been defined in different ways. Economic performance has been considered as an output of CE, which was elaborated into some different aspects such as sales growth (Covin and Slevin, 1991, Lumpkin and Dess, 1996, Mohamad et al., 2011), profitability (Covin and Slevin, 1991, Lumpkin and Dess, 1996), return on asset (Covin and Slevin, 1991), and market share (Lumpkin and Dess, 1996).

In addition, some non-financial outputs such as: staff motivation and organizational culture (Zahra, 1993) and stakeholder satisfaction (Lumpkin and Dess, 1996) have also been considered as a consequence of CE. Other studies considered CE contributes to a company's strategy such as improving competitive capability and strategic repositioning (Ireland et al., 2009), improving competitive positioning, transforming corporations, value creating (Özdemirci, 2011).

The existing frameworks also considered several antecedents that support CE to influence a company's performance. After all of these models were reviewed, it was found the antecedents were categorized into two types: external or environmental antecedents and internal or organizational antecedents. In particular Covin and Slevin

(1991) split internal antecedents into two categories: i) strategy and ii) management and organization.

Both external and internal antecedents have been examined in detail. For example Covin and Slevin (1991) identifed external variables as: technological sophistication, environmental dynamism, hostility and industry life cycle stage; strategic variables as mission strategy, business practices and competitive tactics and internal variables as top management values and philosophies, organizational resources and competencies, organizational culture and organizational structure.

Zahra (1993) revised these antecedents for several reasons. First, technological sophistication was eliminated from the class of external variables because it seems excessive when coupled with environmental dynamism. Munificence has been added regarding to the availability of abundant opportunities to innovate in the industry. Second, internal variables were revisited and revised into: managerial values and background, managerial process, organizational culture and organizational structure.

External and internal antecedents proposed by Lumpkin and Dess (1996) were similar to the ones that were proposed by Covin and Slevin (1991) and Zahra (1993). Mohamad et al. (2011)included government policy, economic conditions, competition and market demand as external antecedents; meanwhile technology and resource availability were classified as internal antecedents. Ireland et al. (2009) only include entrepreneurial personal cognition in the form belief, attitudes and values in internal factors.

After all of these models were examined well, the theoretical framework of CE was developed based on the comprehensive literature review. This theoretical framework can be seen in Figure 2-3. The framework consists of three main components that have been found in almost all existing frameworks. Those components are: 1) CE posture; 2) company's performance as an output or consequence of CE and 3) antecedents that support CE in order to enhance a company's performance. The antecedents consist of external factors and internal factors; the CE was divided into five dimensions: autonomy, competitive aggressiveness, innovativeness, proactiveness, risk taking and the output of the model is company's performance.

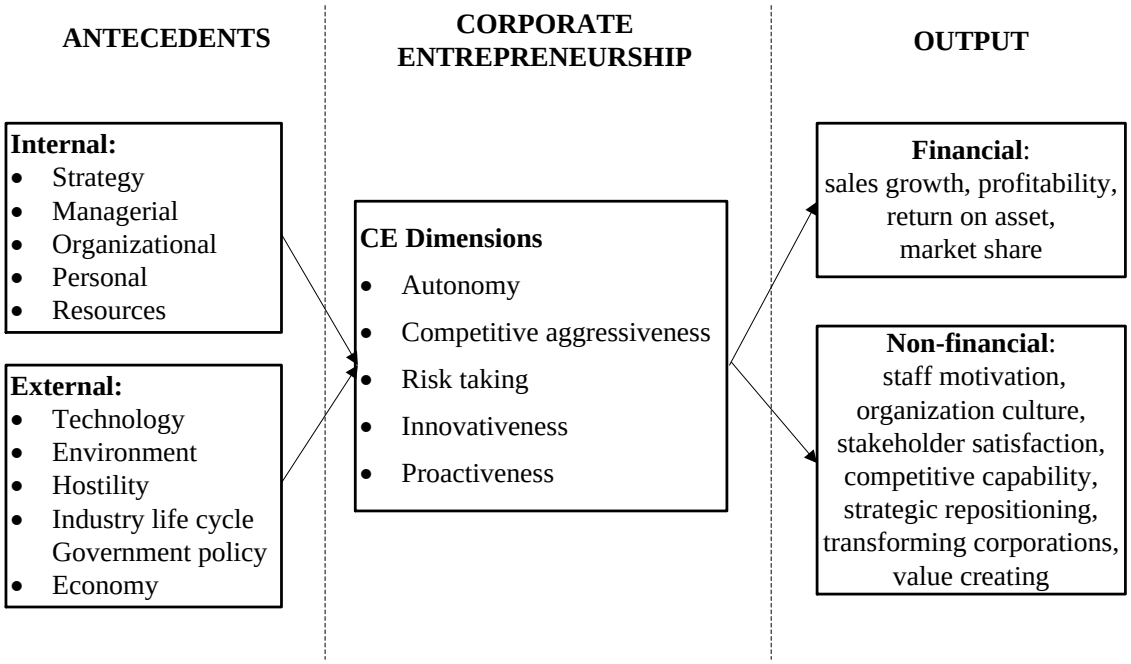


Figure 2-3 CE framework

2.6 CORPORATE ENTREPRENEURSHIP IN CONSTRUCTION

Construction companies have been considered as project based firms (PBFs) that run their business on the basis of projects (Gann and Salter, 2000, Barrett and Sexton, 2006, Blindenbach-Driessen and van den Ende, 2006, Dvir et al., 2006, Bosch-Sijtsema and Postma, 2009). As PBFs, contractors build the projects merely at the specific request of the clients therefore the service that they provide is unique for every client (Blindenbach-Driessen and van den Ende, 2006).

In this particular context, contractors are running businesses that are, in one sense, unique. Contractors are characterized by organizing a temporary project within the framework of the permanent firm's organization (Gann and Salter, 2000, Barrett and Sexton, 2006, Blindenbach-Driessen and van den Ende, 2006, Dvir et al., 2006, Bosch-Sijtsema and Postma, 2009). Hobday (2000) has highlighted the types of organization in PBFs. He considers the most suitable organization structure for PBFs is project based organization (PBO); however, the project organization remains to be carried out within the company's boundaries. In this particular situation, project managers typically have an important role in the business process.

In carrying out their activities, contractors need to manage both business and project by considering their different characteristics. Business processes involve

repetitive activities while projects comprise of temporary and unique activities (Gann and Salter, 2000). Volpe and Volpe (1991) identified two main challenges needed for a contractor to be successful in the contracting business: to win the competition to get the project and to deliver the project successfully. Due to the specific nature of the contractor's business, this study assumed that the concept of CE for contractors is distinct from other companies.

Research on entrepreneurship that related to construction has been limited to the individual level and focused on the personal characteristics of an entrepreneur (Abdul-Aziz and Wong, 2010, Sidek and Zainol, 2011, Jaafar et al., 2014). No research on CE has been found in the construction management research so far, although CE dimensions were investigated individually.

2.6.1 Five Dimensions of Corporate Entrepreneurship in Construction

Several research efforts into innovativeness have been identified, whereas very little research on the other dimensions of CE could be found. Previous research focused mostly on risk management, instead of risk taking behaviour and on competitive advantage instead of competitive aggressiveness. However after the literatures were investigated further, it was found that competitive aggressiveness can be explored through the topic of competitive advantage because competitive aggressiveness makes a major contribution to competitive advantage. Risk taking has become associated with risk management, because discussion about risk taking cannot be seperated from risk management. Very limited research has been found which explored autonomy and proactiveness, even the issues related to these two dimensions should be derived from the literature using different key words. Issues of autonomy were found associated with the key words: control mechanism and empowerment; proactiveness was was associated with key words: positioning, strategy and dynamic capabilities.

2.6.1.1 Autonomy in construction

Very little research on autonomy has been found in the area construction management research. After reviewing several sources, autonomy has been found to be attributed to control mechanisms and empowerment in construction.

Control is a mechanism that is tightly attached, in the construction environments, the individuals, teams and organizations. Control is directed to ensure every action, behaviour and outcome will meet organizational or project aims. One of mechanisms that is suggested to implement the control process is self-based control or empowerment. In this mechanism, autonomy is one of its key factors (Tuuli et al., 2010a, Tuuli et al., 2010b). Autonomy is considered as one of an employee's empowerment manifestations that gives a positive impact to off-site construction productivity such as: resource development, process improvement, worker involvement (Alazzaz and Whyte, 2015). Autonomy as an employee empowerment manifestation, also positively influences job performance (Tuuli and Rowlinson, 2009).

Another study examined the influence of external factors on autonomy in construction companies (Phua, 2012). The study found autonomy is influenced by cultural differences. Peoples and construction companies in more individualist cultures prefer to adopt higher job autonomy. This conclusion was reached based on the comparison of professionals and construction companies in Australia and Hongkong. The results show that Australian professionals prefer higher job autonomy than Hongkong professionals; also, Australian construction companies adopt more individualistic job autonomy practices rather than do Hongkong construction companies.

2.6.1.2 Competitive aggressiveness in construction

By adopting the definition of competitive aggressiveness as discussed earlier, contractors' competitive aggressiveness has been defined as contractors' efforts to outperform the competitors. Supporting this definition, Orozco et al. (2014) mentioned that a construction company requires an effective competitive strategy to be able to survive in the highly competitive era of globalization. Furthermore, in accordance with the nature of contractors as PBFs, in which their business is reliant on projects, the researchers found that leadership, contract management and health and safety management are the three main factors that need to be considered, when trying to outperform competitors. Leadership is a driver of other factors; contract management was associated with the issues of project cost, project time and customer relations. Health and safety management influences project performance, health and safety issues, relation with society.

Another contractors' strategy to overcome the competitors, in order to be awarded the projects is through competitive bidding, in which contractors are faced with a classic dilemma; the bid should be high enough to make profit and certainly not lose money, but not so high as to decrease or rule out the chance of winning the contract (Kim and Reinschmidt, 2011b). Therefore contractors need to implement appropriate strategies when bidding. Tan et al. (2010) mentioned contractors need to use a more comprehensive strategy than simple low-price bidding. Even though their study found the most effective competition strategy was a low bid they introduced other aspects that needed to be considered in order to win the competition, such as: the role of high tech, management innovation, sustainable practice and partnership. Related to bidding strategy, Fu et al. (2002, 2003) found the quality and quantity of bidding experience influence the contractors' bidding competitiveness. Their study shows contractors with more experience in bidding prepare, and are willing and able to prepare, more competitive bids relative to less experienced contractors; a vicious cycle it can be hard to break.

2.6.1.3 Innovativeness in construction

Winch (2000) mentioned that innovativeness is necessary to excel in competition, especially when dealing with changing conditions. He addressed innovativeness as the extent to which the construction company designed its organization to support the creation of innovation. Several studies linked innovativeness to the competitive advantage of a construction company. Barrett et al. (2008) mentioned that appropriate exploitation of innovations can enhance sustainable competitive advantages of small, project based construction firms. By focusing on a large construction company, Pellicer et al. (2010) found innovative performance is an important tool to achieve and maintain success in competition. In the more specific context, Lim et al. (2010) and Gambatese and Hallowell (2011) found that innovative construction firms gained several benefits such as decreasing construction cost and increasing productivity, so that eventually their reputations and success rates will start to improve reputation.

Several studies were carried out to identify factors that influence innovativeness of construction companies. Barrett and Sexton (2006) found the innovation activities of small, project based construction firms are predominantly dependent on the commitment of the owner; innovation is directly related to their operational activities.

Furthermore Pellicer et al. (2010) found the innovative performance of construction companies is affected by various factors including the demands of the new types of project, global markets, high competition, regulatory demands, business culture and, of course, the financial climate. Following this research, Pellicer et al. (2014) found that innovation in construction companies is strongly driven by a project's technical issues, client's demands and top management encouragement.

2.6.1.4 Proactiveness in construction

In this increasingly challenging competitive world, in order to survive, contractors need to understand the dynamic development of the construction market, deeply and well. Identifying challenges sent out by external forces and improving the internal strength of the company in order to seek a business opportunity, are the essential components of a strategy to achieve sustainable growth (Korkmaz and Messner, 2008). In a particular case of competitive strategy, Green et al. (2008) mentioned that construction companies tend to develop their competitive strategy based on external factors; however, strategic management emphasizes the importance of internal factors required in order to develop a competitive strategy. The company should focus on its internal capabilities to reconfigure its existing strategy, in order to response the ever changing environment.

Based on these phenomena, strategy of contractor proactiveness has been evolved. So far, the literature dealing with contractors' proactive actions to seek an opportunity has focused on expanding into new and different markets (Kim and Reinschmidt, 2011a). Particularly, several studies focus on expanding into international market, looking at a company entering unknown territory in a contracting business sense. Entering international market has been considered as a contractors' strategy to deal with construction market change (Han et al., 2010), to avoid domestic market recession (Jung et al., 2010) and to counter the domestic business cycle (Abdul-Aziz and Wong, 2010). The opportunity to expand their market scope, Chinese contractors' penetration to Africa being an excellent example, arises for many reasons. Chen and Orr (2009) identified 18 reasons; the most frequent being the need for good infrastructure in the country of destination, closely followed by diplomatic tie between the government of contractor's home country and the country of destination. Their study also identified political issues, government regulations and security in the country of destination as the

main challenges that need to be considered when giving serious thought to ‘going international’.

Related to the second reason of expanding market, Chen and Orr (2009) found that the role of the home country’s government is an important factor to support the expansion of contractor into the international market. This finding was supported by Zhao and Shen (2008) that mentioned Chinese contractors are very aggressively expanding into the international market because of strong support from their government.

2.6.1.5 Risk taking in construction

Contractors' attitudes to risk have been considered as an important aspect of contractors' competitive success for survival and growth. Risk attitude is a basis of risk taking behaviour (Kim and Reinschmidt, 2011a). Furthermore they associated contractors' risk attitude to contractors’ behaviour in bidding for contracts because bidding is considered as a risky and uncertain activity. Bidding puts the contractor in a dilemma situation: it should be high enough to make profit but a high bid decreases the chance of winning. Han et al. (2005) investigated the influence of contractors’ risk taking behaviour on bidding in an international construction project. Kim and Reinschmidt (2011b) found market diversification is one of the contractors’ strategies for survival and growth which requires bold action to take a risk. Market diversification was defined as expanding out of the current market into a new and different market that is riskier than only trying to improve performance in the current market.

While discussing risk taking behaviour of contractors, it is necessary to understand the types of risks that are normally borne by the contractors. As PBFs, contractors’ risks are mainly associated with projects that they are built. Based on a comprehensive review of the literature, Zou et al. (2014) summarized five types of contractors’ risk that are related to project risk: project cost risks, project time risks, project quality risks, project safety risks, and project environmental sustainability risks.

Other studies have been conducted on factors that influence risk taking. These studies found the following factors influence risk taking behaviour of contractors: experience, costs estimates, conditions of the contract, financial conditions, the need for a project (Wong and Hui, 2006); the company owner’s personality (Acar and Göç, 2011), decision making consequences, experience, availability of project information

(Wang and Yuan, 2011). Fang et al. (2004) found clients' unusual behaviour and interference of government in the construction market are factors that cause contractors to become risk averse.

The main components have been found that contribute to the implementation of the dimensions of CE in construction. Antecedents existed before the implementation of each dimension. During the implementation some factors facilitate the implementation of each dimension, essential as there are also factors that become a barrier. Various manifestations of the implementation of each dimension have been found and all of them were directed to sustain the contractors' business performance. The summary of these findings is presented in Table 2-2.

2.6.2 Indonesian Construction Industry

Data for this study will be collected from contractors in Indonesia therefore the Indonesian construction industry is reviewed to provide an overview of the circumstances underlying the findings of this study. The construction industry in Indonesia has been growing rapidly in the last few years. The size and value of the construction market is one of the most important factors encouraging Indonesia's economic growth.

In 2012, the Indonesian Chamber of Commerce and Industry noted a significant increase in the Indonesian construction industry. It was valued at IDR 284 trillion (or approximately £14.2 billions) in 2012 and then it became IDR 369 trillion (or approximately £18.45 billions) in 2013. It was expected to become IDR 407 trillion (or approximately £20.35 billions) in 2014. The increment in value of the construction industry in Indonesia from 2012 to 2025 is projected by Global Construction 2025 to increase by an average of 6% per year. If this estimation is reached, Indonesia's construction industry will move from the position of the tenth biggest to become the fifth biggest in the global construction market.

Table 2-2 Summary of literature review on CE in construction

CE Dimensions	Antecedents	Influencing factors	Application	Outputs
Autonomy		Culture	Staff empowerment	• Off-site construction productivity (resources development, process improvement, worker involvement) • Staffs' job performance
Competitive aggressiveness	• High competition • Globalization era	• Leadership • Bidding experience	• Comprehensive bidding strategy • Contract management • Health and safety management	Survival
Innovativeness	• Demand of the projects • Client's demand • Global markets • High competition • Regulatory demands • Business culture	• Organization design • Owner / top management commitment	Creation of innovation	Competitive advantage: decreasing cost, increasing productivity, improving reputation
Proactiveness	Dynamic development of construction market	• External forces • Internal strength	Expanding market: new and different market	Sustainable growth
Risk taking	Project risks: cost, time, quality, safety, environment sustainability	Experiences, cost estimate, condition of contract, financial condition, need for projects, owner personality, decision making consequences, project information	• Behaviour in bidding • Market diversification	Survival and growth

The gross domestic product (GDP) of the construction sector provides a significant contribution to the total GDP of Indonesia and this contribution has increased from year to year. Table 2-3 and Figure 2-4 show the GDP of the construction sector from 2010 to 2014 according to the data from the Bureau of Indonesian Statistics.

Table 2-3 GDP of the construction sector in Indonesia

	2010	2011	2012	2013	2014
GDP of Construction sector*)	660,890.5	753,554.6	844,090.9	907,267	1,014,540.8
GDP Total*)	6,446,851.90	7,419,187.10	8,230,925.90	9,087,276.50	10,094,928.90
(%) of GDP Construction sector	10.25	10.16	10.26	9.98	10.05

*) in IDR billions (approximately £1 equivalent to IDR 20,000)

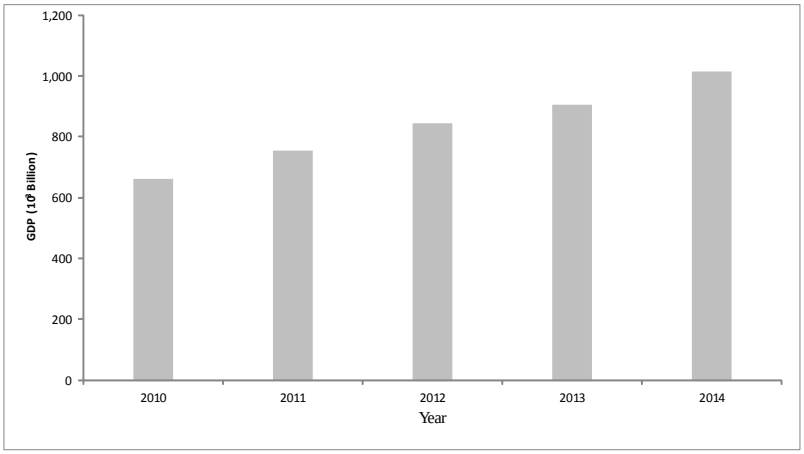


Figure 2-4 GDP of the construction sector in Indonesia

The competition in the construction market is high, either locally or globally. The number of local contractors that are identified by the Bureau of Indonesian Statistics was extremely large. From 2010 to 2013 the number of local contractors in Indonesia was recorded to be approximately 130,000.

In addition to competition among local contractors, the force of global free trade creates increasingly higher and harsher competition. In 2013, 302 foreign contractors have been registered in Indonesia. This number shows a significant increase compared

to the number in the previous two years, with only 128 in 2011. Although the number of foreign contractors entering the Indonesian construction market is very small compared with the number of local Indonesian contractors, the foreign companies are contractors with very good reputations; therefore they are tough competitors for the Indonesian contractors to try to deal with. Currently Indonesian contractors also face the 2015 ASEAN Economic Community (AEC), in which ten Southeast Asia countries are launching a single market for goods, services, capital and labour. Obviously the AEC will increase the competition in Indonesia's construction market.

However, these opportunities and challenges are informed by the unpreparedness of Indonesian contractors to excel in business competition. Among that huge number of Indonesian contractors, the majority are small businesses. Wirahadikusumah and Pribadi (2011) noted that the majority of the contractors had only poor to fair performance. Out of the 130,000 only about 100 contractors can be considered 'excellent' to be trusted to deliver high quality performance. The composition of small, medium and large contractors from 2008 to 2013 based on the data from Bureau of Indonesian Statistics are presented in Table 2-4 and Figure 2-5.

Large numbers of small contractors with poor performance leads to various other problems in the Indonesian construction industry, such as:

- Collusion and unfair competition (Suraji et al., 2007)
- Low competitiveness because of failure to develop relevant strategies in running their business (Soeparto et al., 2007, Sudarto et al., 2008a, Budiwibowo et al., 2009).
- Business orientation that focused on short term benefit rather than long term business sustainability (Soeparto et al., 2007)
- Low competitiveness, lack of marketing strategy, lack of entrepreneurial strategy, lack of capability to compete with foreign contractors (Sudarto et al., 2008a)
- Failure to focus on a particular market and tendency to work on any project (Budiwibowo et al., 2009)

This situation resulted in unconducive business environment in the Indonesian construction industry that creates low competitiveness.

Table 2-4 Number of contractors in Indonesia

Size	Year			
	2010	**2011**	**2012**	**2013**
Small	116,982.00	115,515.00	109,683.00	110,321.00
Medium	10,934.00	16,372.00	17,699.00	18,243.00
Large	2,516.00	2,117.00	2,480.00	2,516.00
Total	130,432.00	134,004.00	129,862.00	131,080.00

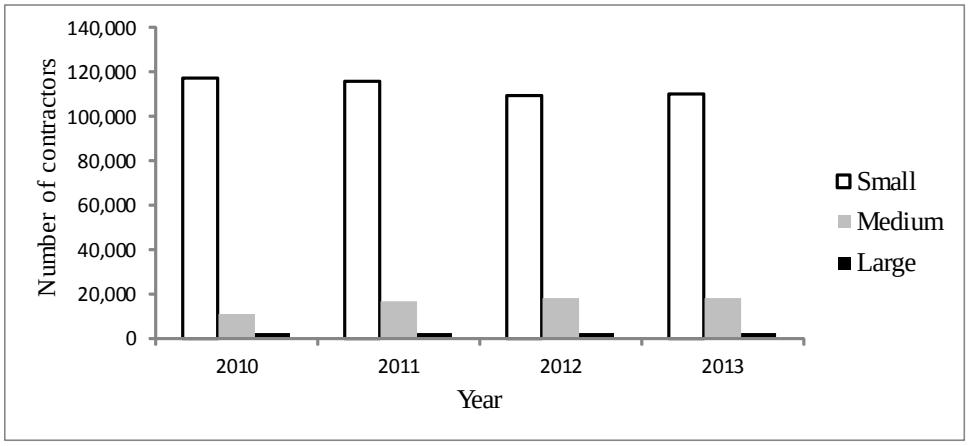


Figure 2-5Number of contractors in Indonesia

This internal problem has been aggravated by the problems coming from external stakeholders. Sudarto et al. (2008b) found several external factors that influence the performance of the construction industry in Indonesia such as high interest rate charged on loans, little support from financial institutions, the competition is not equitable, and business conditions are unpredictable.

In order to address the complex issues faced by most contractors in Indonesia, an appropriate corporate strategy is needed urgently. The experiences of companies in several industries clearly show the influence of CE on the success of their businesses. Considering the power of CE and the problems of contractors in Indonesia, CE is expected to solve the problem with Indonesian contractors. Figure 2-6 presents the condition of Indonesian contractors and their challenges.

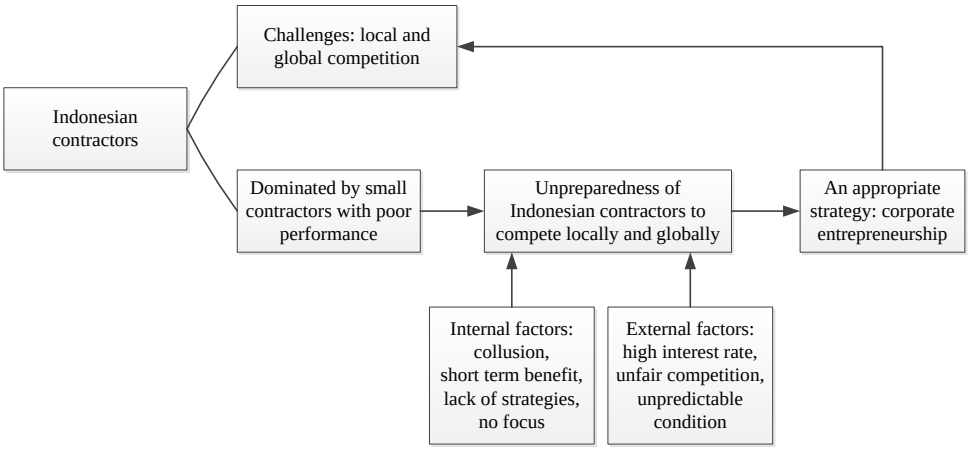


Figure 2-6 CE for Indonesian contractors

2.7 ENTREPRENEURIAL ORIENTATION ASSESSMENT

The concept of CE and its influence on a company's performance has been discussed in the previous chapter. Several studies considered the importance of assessing a company's capability in order to develop a proper corporate strategy to move on from its current condition to the expected condition. The assessment of a firm's current condition and reasonably target condition is directed to identify the existing discrepancy between them. Then further analysis of this discrepancy enables an organization to develop an appropriate model to move from its current condition to the condition that will be achieved (Hillson, 1997, Nightingale and Mize, 2002, Team, 2010). Figure 2-7 presents the relevance of assessment framework for assessing CE.

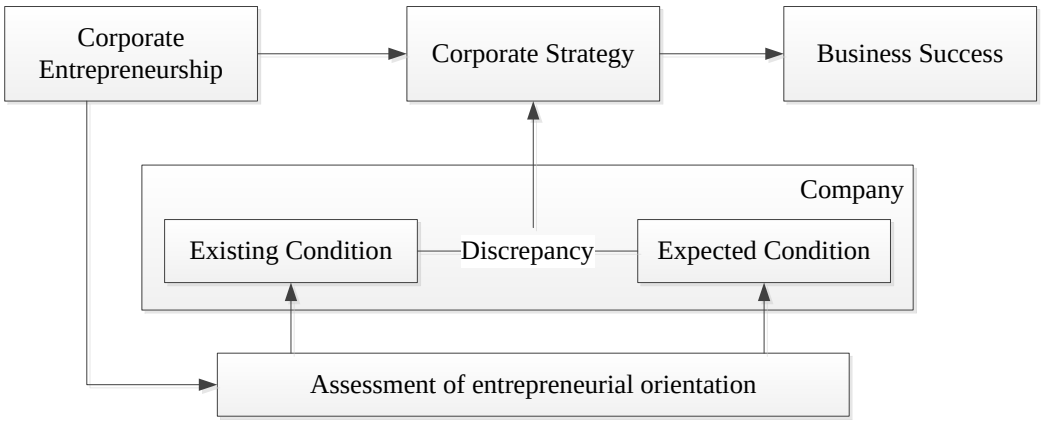


Figure 2-7 The relevance of entrepreneurial orientation assessment

Numerous methods for measuring the entrepreneurial orientation of several types of companies such as manufacturing, service, high technology have been found in the existing literature. After reviewing these models, it was found the CE indicators proposed by Miller (1983) were the most adopted items to measure entrepreneurial orientation of the companies. These indicators are derived from three dimensions of CE: innovativeness, proactiveness and risk taking. A study by Lumpkin and Dess (1996) translated CE indicators from five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking.

Zahra and Covin (1995) did a study on the impact of CE on a company's financial performance. The reseach was conducted through three case studies of firms in manufacturing, chemical and industry. Zahra and Garvis (2000) examined the impact of international CE on the financial performance of manufacturing companies. Wiklund and Shepherd (2005) conducted a study that related entrepreneurial orientation to financial performance and growth of small business investigating companies in manufacturing, services and the retail sector. Frank et al. (2010) measured CE in order to identify the relationship between a company's entrepreneurial orientation and the companies' sales and cash-flow growth.

In these studies, three components of CE from Miller: innovativeness, proactiveness and risk taking have been explored in the different ways. Zahra and Covin (1995) spell out those three component into 7 items: introducing new products and services; dramatic changes in products and services; innovation in products and services; strong proclivity for high risk projects; positioning itself and its products and services; strong commitment to R&D, technological leadership and innovation and exploiting opportunities. In similar ways, those three components were spelt out into 7 items by Zahra and Garvis (2000): high tolerance for high risk projects; 'tried and true' procedures, systems and methods; challenges rather than responds to competitors; take bold actions rather than minor changes tactics; pursuit long term goals and strategies; to be the first in introducing new products and rewards taking calculated risks.

Wiklund and Shepherd (2005) and then followed by Frank et al. (2010) translated Miller's three components of CE into eight items with the following details: three items of innovativeness, two items of risk taking and three items of proactiveness. Those eight items are tendency to be ahead of competitors; growth, innovation, and development oriented; following "undo-the-competitors" philosophy; risk taking was measured by

two items; proclivity toward high-risk projects; emphasis on R&D, technological leadership and innovations; markets many new products or services; dramatic changes in product or service lines.

Hughes and Morgan (2007) measured CE using five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking as proposed by Lumpkin and Dess (1996). These five dimensions were elaborated into 18 items. The study was aimed to examine the relationship between entrepreneurial orientation and business performance. The study was carried out in high technology firms.

Instead of the corporate entrepreneurhip indicators proposed by Miller (1983) and Lumpkin and Dess (1996), CEAI has been developed by Hornsby et al. (2002) to assess a the company's environnment that supports the implementation of CE. CEAI was developed based on middle managers perceptions of the CE environment within their company. This instrument covers 43 items categorized into five organizational factors: 1) management support to implement CE; 2) autonomy that is provided to the staff; 3) organizational boundaries that can be a barrier to implement CE; 4) rewards/reinforcement that motivate the staff to work well; and 5) time availability for the staff to carry out their jobs properly.

Later on CEAI was used by van Wyk and Adonisi (2012) to measure CE in their research about the influence of market orientation, flexibility and job satisfaction to CE. The CEAI that was adopted in this study was not the original CEAI (Hornsby et al., 2002) but a re-evaluated version of the CEAI that covers six organizational factors: rewards/reinforcement, innovative initiatives, financial support, sufficient time, organizational boundaries and inadequate time. Five Likert-type scales ranging from 1 for strongly disagree to 5 for strongly agree were used in this study. Samples for this study was selected from four sectors: life insurance, information technology, university of technology and transport parastatal.

Most of these studies use Likert-types scales to measure each indicator of CE but with different approaches as follows.

- Seven point scale from1 for very untrue to 7 for very true (Zahra and Covin, 1995).

- Five point scale from 1 for very untrue to 5 for very true (Zahra and Garvis,

2000).

- Seven point scale from 1 for strongly disagree to 7 for strongly agree (Hughes and Morgan, 2007).

- Five point scale from 1 for strongly disagree to 5 for strongly agree (Hornsby et al., 2002, van Wyk and Adonisi, 2012).

Wiklund and Shepherd (2005) and Frank et al. (2010) use seven point scale between two opposite statements that represent entrepreneurial and nonentrepreneurial cicumstances

Table 2-5 presents the existing corporate assessments that have been reviewed in this section. The first four studies (Zahra and Covin, 1995, Zahra and Garvis, 2000, Wiklund and Shepherd, 2005, Frank et al., 2010) adopted three dimensions of CE: innovativeness, proactiveness and risk taking, that were proposed by Miller (1983). These dimensions are regarded as the most suitable items to measure the entrepreneurial orientation of companies. However, Lumpkin and Dess (1996) considered they were inadequate and so consequently two other dimensions, autonomy and competitive aggressiveness were added.

Table 2-5 Existing CE assessment

Authors	**Measurement items**						**Measurement scale**
	IN	**PA**	**RT**	**AU**	**CA**	**CEAI**	
Zahra and Covin (1995)	√	√	√				7 point Likert scale
Zahra and Garvis (2000)	√	√	√				5 point Likert scale
Wiklund and Shepherd (2005)	√	√	√				7 point scale between two opposite statements
Frank et al. (2010)	√	√	√				
Hughes and Morgan (2007)	√	√	√	√	√		7 point Likert scale
Hornsby et al. (2002)						√	5 point Likert scale
van Wyk and Adonisi (2012)						√	5 point Likert scale

Note:
IN = Innovativeness PA = Proactiveness RT = Risk Taking
AU = Autonomy CA = Competitive Aggressiveness
CEAI: management support, autonomy, organizational boundaries, rewards / reinforcement, time availability

In adding these two dimensions, Lumpkin and Dess (1996) provide reasonable arguments, as were explained earlier in this section. Therefore, the five dimensions of CE, that have been adopted by Hughes and Morgan (2007), can be considered as comprehensive dimensions that are conceptually clear.

The CEAI that has been developed by Hornsby et al. (2002) and later by van Wyk and Adonisi (2012) highlighted the entrepreneurial orientation of a company from a different angle: CEAI is oriented towards internal organizational factors. After reviewing all of these models, this study consistently focuses on the five dimensions of CE proposed by Lumpkin and Dess (1996): autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking.

This study found that most studies that measured CE were focused on the relationship between CE and business performance; therefore the tools to measure CE were not developed for comprehensive assessment. All of the models measure levels of CE on several items and then each item was assessed, based on Likert-type scales; the average value was then calculated to show the levels of CE. However, when considering the relevance of these tests for companies to develop their corporate strategies, based on the CE concept, in order to improve their business performance, a comprehensive instrument to assess CE is needed.

Currently several standards, models, methodologies and guidelines are offered in the marketplace to help companies to measure their performance and to improve the way to do business. Among the models, the Capability Maturity Model (CMM), developed by the Software Engineering Institute, Carnegie Mellon University (Paulk et al., 1993) is considered as a comprehensive model that is explained clearly and which has been improved from time to time. A review of the CMM, and its various further developments, will be carried out in Chapter 5.

2.8 SUMMARY

This chapter has presented a review of entrepreneurship with a special focus on CE. Further reviews of the relation between CE and company performance showed that CE gives positive impact to business success. The particular review of CE in construction showed no research on CE had been found that was specifically oriented

towards construction management. In fact business in construction, especially contractors, is of a specific nature that requires a specific strategy; therefore this study started from the assumption that CE can be considered as a strategy to support contractor's business success.

In the particular case of Indonesia, its construction industry promises tremendous opportunities for Indonesian contractors. However, the contractors in Indonesia have a problem: they lack the ability to perform properly in dealing with strong competition. In this situation, an appropriate strategy is needed to improve the performance of Indonesian contractors.

In order to fill this gap, further research into the value of CE for contractors will be carried out, based on the experiences of contractors in Indonesia. Five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking (Lumpkin and Dess, 1996) are adopted in order to explore the implementation of CE in contractors.

Furthermore, after the value of CE for contractors has been understood, the next step is how contractors can develop the corporate strategy based on CE to achieve business success. In order to achieve this aim, contractors need to understand the existing and target entrepreneurial characteristics of their company and then develop the strategy to move from their existing level to their target level of CE. In order to identify their entrepreneurial characteristics, companies need a framework to assess those characteristics.

After review of several previous studies that discussed how CE has been measured, it was found that a model for assessing CE has not been developed comprehensively. The existing studies were more focused on the relationship between CE and the company's performance. In order to compensate for that omission, this study is attempting to develop a model to assess the entrepreneurial orientation of contractors.

Chapter 3 - RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research design and methodology that is used in this study. Firstly the general concept of this research is presented and then it is followed by specific research concepts and methodologies adopted for this study. The discussion started from the initial idea-raising stage of research, then continued by literature review to identify the research gap, and then to define the research aim and objectives. Finally, the research methodology, that is suitable to achieve the research aim and objectives, is determined.

3.2 THE RESEARCH PROCESS

Research is a systematic activity with a specific purpose that is directed to the existing problem or concern of the researcher. The existing problem or researcher's concern usually is trigged by several reasons, such as the insistence of organizational issues, the emergence of specific opportunities, the insistence of personal experiences and the relationship with science theories (Bryman and Bell, 2011). Systematic activity in research is carried out through several stages.

Blaikie (2010) mentioned that the social research process usually encompasses three main stages: planning, executing and reporting. These three stages can be implemented separately and sequentially or blended into each other, depending on the nature of the research. In more detail, Collis and Hussey (2003) mentioned that any kind of research in any field inevitably requires a research process that includes several stages such as: identify the research topic, define the research problem, determine how to conduct the research, collect the research data, analyse and interpret the research data, and write the dissertation / thesis / report

According to Bryman and Bell (2011) a research process includes the following stages: choice of research area, formulation of research question, choice of method, formulation of research design and data collection techniques, implementation of data collection, analysis of data, interpretation of data and conclusion. Another research

process was proposed by Saunders et al. (2012), who highlighted three main stages of the research process: conceptualization, implementation and interpretation. These three stages were then elaborated into several research activities.

Defining a research problem is a stage to narrow down the broad idea of the researcher into a particular research problem which is reasonable to be investigated. Furthermore, defining a research problem will be directed to the formulation of research questions. Usually a research problem in academic research is identified through a literature review, designed in part to find any research gaps that exist in the published literature.

The next stage in the research process is concerned about how the research will be conducted. This general approach is widely known as research methodology, which involves several aspects that need to be considered prior to the research itself being carried out. After completing a research plan, the next stage is research execution. This stage consists of two stages: data collection and data analysis. There are a variety ways for data collection and data analysis to be accomplished. The selection of an appropriate data collection method for obtaining data which is in accordance with the research aim depends on the research planning that has been prepared. Afterwards the data is analysed using the appropriate methods and the results are interpreted to answer the research questions that have been formulated. Finally the whole process of the research and the research findings should be written up for the dissertation, thesis or report, depending on the purpose of the research. In order to provide a clearer picture about the research process, it is summarized in Figure 3-1.

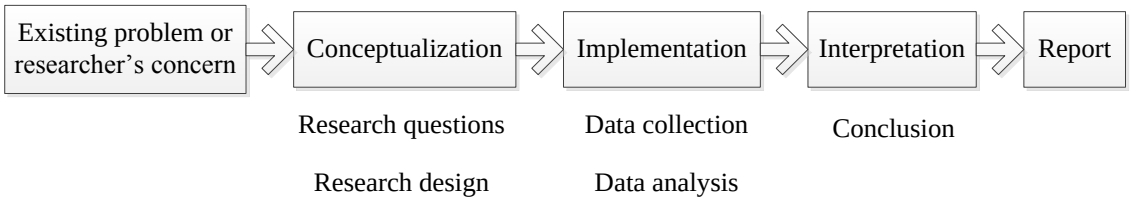


Figure 3-1 Research process

3.3 RESEARCH METHODOLOGY

Bryman and Bell (2011) started to discuss research strategy from the nature of

the theory - research relationship. This relationship between theory and research involves two different research approaches: deductive and inductive. In addition, the authors also attributed research to epistemological consideration and ontological consideration as a philosophical basis for formulating research questions and determining research implementation.

Following this stage, the discussion then turns to the issue of data collection and data analysis. Quantitative and qualitative are two central concepts which distinguish different strategies for carrying out research in many fields. These two strategies are philosophically different, rather than simply distinguished by considering the presence of numbers for quantitative research and the absence of numbers for qualitative research. Quantitative research involves a deductive approach to define the relationship between theory and research, while qualitative research tends to involve the inductive method. At the end of the discussion about research strategy possibility to combine quantitative and qualitative approaches in one research project is examined.

The next discussion pays attention to a decision that concerns about the choice of research design for collecting and analysing data. Bryman and Bell (2011) outlined five different research designs: experimental, cross-sectional, longitudinal, case study and comparative.

Saunders et al. (2012)proposed a model that is named research onion. In this model, research is divided into several stages which are positioned in a sequence. The 'research onion' consists of one centre layer which is covered by five outer layers. These five outer layers represent issues underlying the data collection techniques and data analysis procedure, which belong in the centre of the onion. Of the five layers, the two outer layers are considered as a base of the next three inner layers which are concerned with the overall plan of research that will bring the research questions into the research project.

These two models are essentially similar but different in the way they classify and present their components. When these two models are investigated, the similarities and differences are found. Saunders et al. (2012) through the research onion, have explicitly classified the research process into several stages that are positioned sequentially stage by stage, layer by layer. Bryman and Bell (2011) convey a similar research methodology but it is not explicitly arranged in the sequence stages. In the next sections, the research process is explored further based on the concepts of the research

onion.

The research onion along with research stages can be seen in Figure 3-2. Every layer of the onion, that represents every stage of research, is explained as follows.

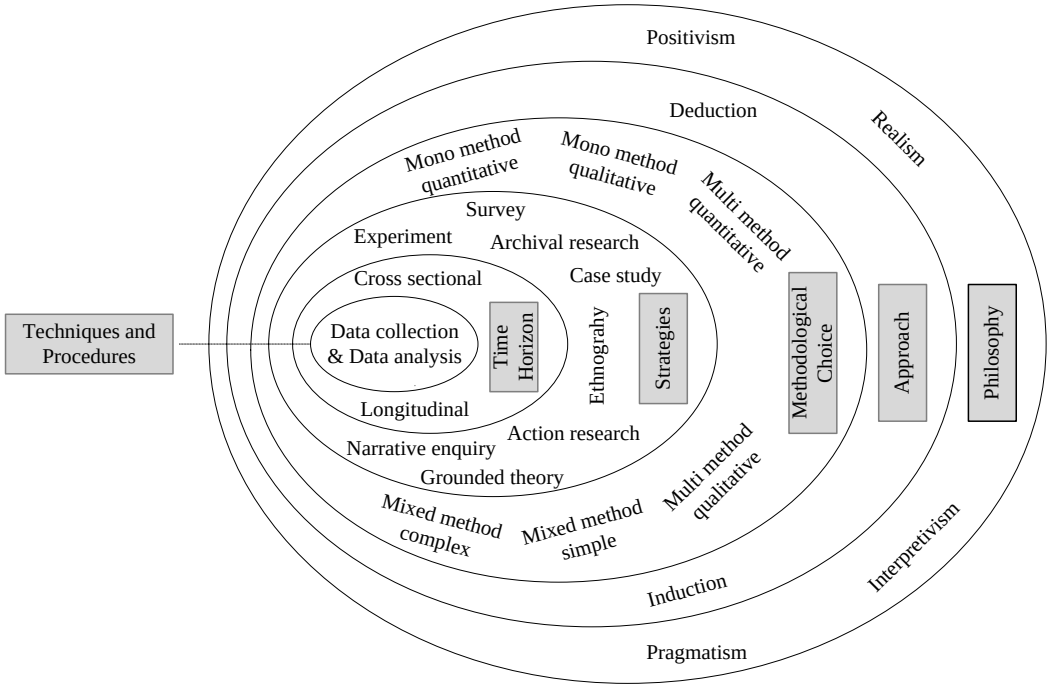


Figure 3-2 Research onion (based upon the diagram of Saunders et al. (2012)

1. Research philosophy as a starting point of research is placed in the first, outer layer. This layer covers two major philosophies of research: epistemology and ontology that are translated into: positivism, realism, interpretivism, pragmatism. These research philosophies influence the researcher's way of thinking about the research process.

2. Research approach is placed in the second layer. Two different approaches are included in this stage: deductive approach to test the theory and inductive approach to build the theory

3. In layer three the research process is focused on the choice of research methods for data collection techniques and analysis. The two methods: quantitative and qualitative, are presented among other options as choices for research design, as well as collection and analysis of data. These two methods can be adopted individually or combined.

4. The next layer or fourth layer describes research strategy. In this stage some

research strategies are offered to answer research questions and to achieve research aims. The strategies that can be used include experiment, survey, case study, action research, grounded theory, ethnography and archival research.

5. Layer five represents the stage to choose the time horizon of the research. Research can be planned as a snapshot, taken at a particular time, only or a representation of events over given period. The former is called cross-sectional while the latter is called longitudinal.

6. Finally after the philosophical basis and research design were investigated, research will arrive to the core of research onion. The core represents techniques and procedures for data collection and data analysis that are directly related to the implementation of the particular research project.

3.3.1 Research Philosophy

The research philosophy is a starting point for the research that addresses the overall terms related to the development of knowledge and the nature knowledge. In fact this stage is often forgotten by researchers. Most researchers start thinking about research from the position of techniques and procedures for data collection and analysis. However Saunders et al. (2012) explained that the decision at research philosophy stage is important because it will underlie the research strategy and research methods in the next stages. Supporting this suggestion, Easterby et al. (2008) argued failure to think thoroughly about philosophical issues of research will have a negative effect on the quality of research because the research philosophy is an initial but essential component of research design. There are two major philosophical approaches which will affect the researcher's thinking about the research process to be carried out: ontology and epistemology.

Ontology was associated with 'the nature of reality' (Saunders et al., 2012) or 'the nature of social entities' (Bryman and Bell, 2011). This approach consists of two aspects termed as 'objectivism' and 'subjectivism' by Saunders et al. (2012) whereas Bryman and Bell (2011) substitute 'constructivism' for 'subjectivism'. Objectivism is attributed to the phenomena where social entities take place independently of social actors, while subjectivism considers social phenomena as a consequence of social

actors' action which are constantly changing.

Epistemology is regarded as a theory of knowledge by Bryman and Bell (2011). In particular this approach is associated with the question of 'whether the social world can and should be studied according to the same principles, procedures, and ethos as the natural sciences'. Epistemology introduces three approaches to the development of knowledge: positivism, realism and interpretivism. Positivism refers to a social research process based on natural science methods. This approach considers data is collected from the reality that is faced by researcher and is not concerned with the feelings and attitudes in collecting data. The opposite to positivism, there is interpretivism that conducts research based on human behaviour and feeling rather than visible facts.

Another research philosophy is realism which is related to scientific enquiry. Saunders et al. (2012) considers realism as a branch of epistemology close to positivism but Bryman and Bell (2011) did not consider realism as a separate branch of enquiry, but as a part of positivism. Furthermore Saunders et al. (2012) describe realism as an approach based on a belief that what is captured by our senses as reality is the truth.

3.3.2 Research Approaches

Easterby et al. (2008), as well as Saunders et al. (2012), noted that research always involves the use of theory. Bryman and Bell (2011) clarify this observation by declaring that the main issue in the relationship between research and theory is whether research is done to test the existing theory or to develop a new theory. Furthermore they mentioned that theory can be considered as a guidance of, and to give contribution to, data collection, as well as data analysis or alternatively theory can be developed based on research findings. The relationship between theory and research raises two different research approaches: the deductive and the inductive.

Deduction is associated with testing a theory, alternatively inductive is an approach to build a theory. Bryman and Bell (2011) depict the essence of the difference between these approaches in a simple diagram, as can be seen in Figure 3-3. The next sections discuss these two approaches in more detail.

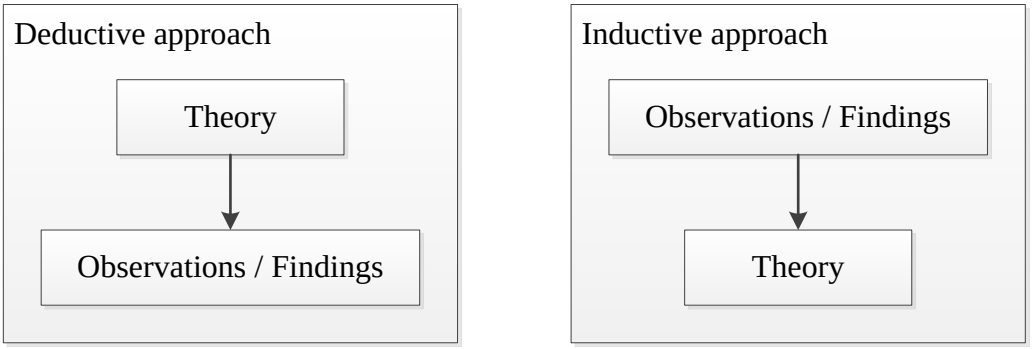


Figure 3-3 Deductive and inductive approaches (Bryman and Bell, 2011)

Saunders et al. (2012) explained that deduction approaches research by developing a theory or hypothesis, then designing a research strategy to test the hypothesis. In order to further clarify the deductive approach, several important characteristics of this approach were identified. These characteristics can be taken into consideration by researchers in selecting this approach.

First, the deductive approach searches for a relationship between variables, therefore this approach directs research to set up a hypothesis which then needs to be tested either to confirm or disprove a relationship between variables. To test the hypothesis, a quantitative data need to be collected. Another characteristic of the deductive approach is quantitative data collection.

Another important characteristic of the deductive approach is controlling variables in order to allow the hypothesis testing and to get a reasonable result. The deductive approach also requires the application of highly structured research methodology and researchers to remain objective and independent from what is being observed. Another additional important characteristic is research should be able to quantitatively measure the issue that is being studied. Finally the last characteristic of deductive research is the generalization of research conclusions. Consequently this research should select a sufficient sample size. In order to give a clear picture about the deductive approach, Bryman and Bell (2011) summarized this model into six steps, as depicted in a flow chart in Figure 3-4

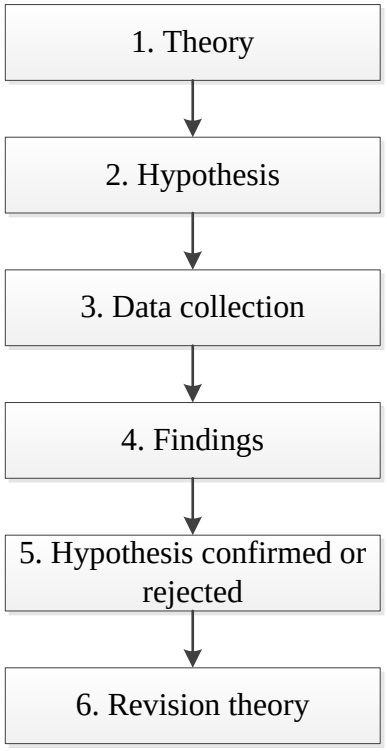


Figure 3-4 The process of deduction (Bryman and Bell, 2011)

Alternatively research can be conducted by the inductive approach, in which data is collected, from which a theory is formulated based on the findings of the data analysis. Data is collected through the process that directly involves a researcher. Compared to deduction, the inductive model uses a less structured methodology that makes this approach more flexible to explain what is going on. Research based on an inductive approach is subjected to a relatively small sample size and the conclusion relates to a particular context and place. The data collected for research based on the inductive approach tends to yield qualitative data rather than quantitative.

Several major different characteristics between the deductive and inductive approach are summarized in Figure 3-5 and Table 3-1.

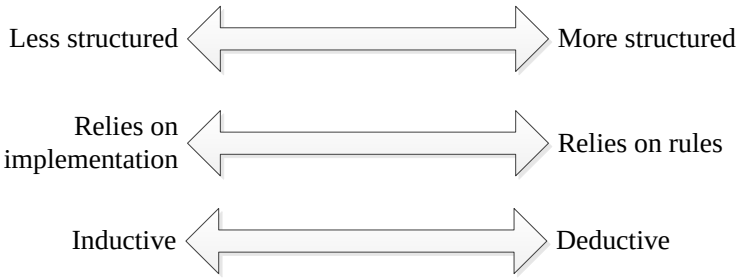


Figure 3-5 Dimensions of qualitative analysis(Saunders et al., 2012)

Table 3-1 Comparison between deductive and inductive

DEDUCTIVE	INDUCTIVE
transforming theory to research	formulating theory based on the findings of data analysis
considering relationship among variables	
collecting quantitative data	using qualitative data
controlling variables in hypothesis testing	
using highly structured methodology	adopting less structured methodology
Independency of researcher from what is being researched	researcher is deeply involved in the research process
generalizing the conclusion of research	concern to a particular context and place

After peeling out the first two outer layers, the researcher will reach the next three layers of research the onion: research choices, research strategies and time horizons. These three inner layers will be focused on the process of research design that is influenced by the two outer layers that have been peeled off: research philosophy and research approaches. The research design contains a plan of how research project will be carried out to answer the research questions.

3.3.3 Research Method Choices

The discussion in the previous section has mentioned qualitative and quantitative data. The terms quantitative and qualitative can be distinguished in a simple way by linking them with the existence of numbers or numerical data. Saunders et al. (2012) explained the terms quantitative and qualitative, in business and management research, are widely used to describe types of data collection and data analysis. Quantitative represents the method for data collection technique and data analysis that focuses on numerical data, while qualitative is used for the same purposes but intended for non-numerical, descriptive data. Therefore, qualitative data can involve and relate to information from words, pictures, videos.

Bryman and Bell (2011) argue that the distinction between quantitative and qualitative is deeper than just the presence or absence of measurement. They are basically different in some other respects. The distinction between quantitative and qualitative is shown wider and deeper by comparing them based on the relationship between science and philosophy, as well as two orientations of research philosophy: epistemology and ontology. The comparison is shown in Table 3-2.

Table 3-2 Fundamental differences between quantitative and qualitative research strategies (Bryman and Bell, 2011)

	Quantitative	**Qualitative**
Principal orientation to the role of theory in relation to research	Deductive, testing of theory	Inductive, generation of theory
Epistemological orientation	Natural science model, in particular positivism	Interpretivism
Ontological orientation	Objectivism	Constructivism

In fact, the difference between the qualitative and qualitative designs is not as sharp as what was presented in Table 3-2, as these two research methods can be applied simultaneously in one research project. Thus a method called ‘mixed method’, that combines both quantitative and qualitative approaches, is available.

In selecting an appropriate method to be applied in a research project, the researcher can select either one method or multiple methods. Selection of the method should have taken into account compatibility with the research question to be answered. Regarding the combination of research methods, Saunders et al. (2012) developed a tree diagram for research choices as can be seen in Figure 3-6. A mono method means the researcher chooses a single method for the data collection and the data analysis, which can be either quantitative or qualitative. For example, data is collected through questionnaires and analysed using an appropriate quantitative analysis procedure or data is collected through in-depth interviews and analysed using an appropriate qualitative analysis procedure.

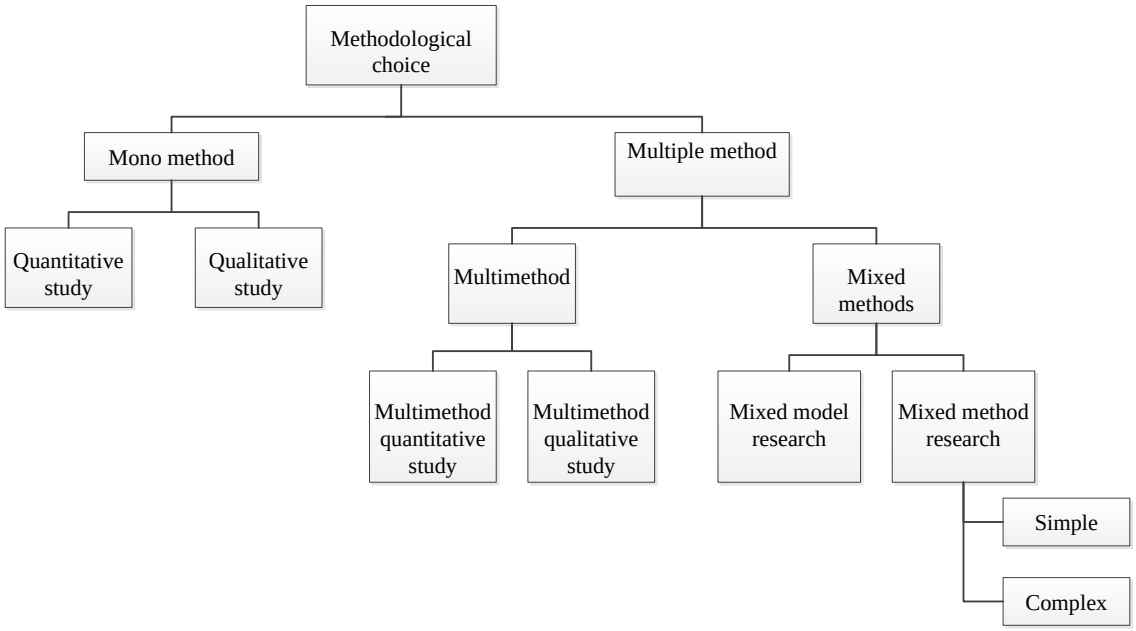


Figure 3-6 Research choices (Saunders et al., 2012)

Alternatively, a researcher can choose more than one method to be used for data collection together with associated data analysis techniques. There are four different combinations as an alternative of multiple methods. The first alternative is multi-method quantitative studies, in which a researcher can use more than one technique for data collection; for example questionnaire combined with structured observation, followed by data analysis using quantitative procedures. The second alternative is similar to the first one but using a qualitative technique. In this alternative, data is collected for example using in-depth interview and from documents, after which qualitative procedures are used to analyse the data. These two alternatives offer the combination of techniques and procedures but do not combine quantitative and qualitative methods.

The other two alternatives offer using of both quantitative and qualitative methods. The first alternative is mixed-method research that uses both quantitative and qualitative methods for data collection and data analysis but the two methods are applied independently. The quantitative technique is used for collecting quantitative data and then the data is analysed using an appropriate quantitative procedure. In addition, a qualitative technique and procedure is used in the same research project. The second alternative, which is mixed-model research, combines quantitative and qualitative methods. For example the qualitative data is converted into numerical codes and then it is analysed using quantitative procedures.

An important issue that needs to be considered when a researcher uses mixed methods is about timing to conduct each method. Quantitative and qualitative methods may be conducted sequentially or concurrently. Creswell (2003) proposed three variations of timing in mixed methods as described below.

1. Sequential procedures are used when the research findings of one method will be elaborated further or expanded with another one.

2. Concurrent procedures involves both methods at the same time in order to get a comprehensive result

3. Transformative procedures conduct either sequential or concurrent procedures in a theoretical lens, as a perspective of the researcher

3.3.4 Research Strategy

The second stage of the research design is the selection of strategies that will be conducted in the research project. The selected strategy is associated to research approach that has been chosen in the previous stage, whether it is inductive or deductive approach. It is important to understand that among the strategies there is no single strategy considered to be superior or inferior compared to any of the others. Thus the most important consideration in selecting the appropriate research strategy is to consider the ability of the strategy to answer research question by gathering sufficient and relevant data.

Saunders et al. (2012) examined a set of research strategies that should not be considered as mutually exclusive, because it is possible to use more than one strategy in one research project. These research strategies are experiment, survey, case study, action research, grounded theory, ethnography and archival research.

Among these research strategies, experiments and surveys are the strategies that are mostly related to quantitative approaches; while case study, action research, grounded theory, ethnography and archival research tend to be associated with the qualitative approach.

3.3.5 Time Horizons

Another important issue that needs to be considered by researcher is their time horizon; that is the period over which the data collection will be conducted. Of course once again this issue depends on the research question that has been defined at the initial stage of the research project. Saunders et al. (2012) considered two alternatives of time horizons that can be chosen the data collection. The first alternative is cross sectional, the second is longitudinal.

Cross sectional research is considered as a 'snapshot' time horizon, when the data is collected at a particular time. Furthermore Bryman and Bell (2011) emphasizes that cross sectional is characterized by collecting data from more than one case but at a single point of time.

Longitudinal involves research in which data is collected over an extended period of time to study the development and change of a particular phenomenon. This kind of research usually takes place over a considerable time, lasting decades or even longer; consequently it will be expensive to administer. Bryman and Bell (2011) found that longitudinal is rarely used in the area of business and management because of time and cost constraints.

3.3.6 Data Collection and Data Analysis

When layer by layer has been peeled away, the researcher will reach the core of the research onion that contains the 'research techniques and procedures for data collection' and to 'data analysis'. Most researchers have been thinking about this stage since the beginning of research process and usually forget about the previous stages. Two important aspects need to be considered and planned when dealing with data collection; selecting the appropriate sample and choosing optimal data collection methods.

A sample has been defined as a segment or a subset or a sub-group or a selection of elements of the population (Collis and Hussey, 2003, Easterby et al., 2008, Blaikie, 2010, Bryman and Bell, 2011, Saunders et al., 2012) . Furthermore this definition was clarified by other authors who added that the chosen subset should perfectly represented the population (Easterby et al., 2008, Blaikie, 2010). Population has been defined by

Ticehurst and Veal (2011) as ‘the total category of subjects that is the focus of attention in a particular research project’ or ‘an aggregate of all cases that conform to some designated set of criteria’ (Blaikie, 2010). Understanding sampling is important because, in most research, a survey is not possible to be carried out within the whole population. There are obvious time and cost constraints to collecting data from an entire population (Ticehurst and Veal, 2011).

Selecting sample is an important issue in quantitative research because the results found from a good sample can be generalized to represent the results from the entire population. In order to get a good sample, researcher needs to consider two important issues: representativeness in sampling and appropriateness of sample size. The three most popular sampling methods are random, systematic and stratified (Collis and Hussey, 2003). According to Ticehurst and Veal (2011), sample size is determined by three considerations: accuracy of results, detail of analysis and budget constraint.

Silverman (2011) mentioned in qualitative research, sample authenticity is more important than sample size. It means that sample selection in qualitative research is more focused on how to collect data from an authentic understanding of people’s experiences. According to Creswell (2003), qualitative research does not necessarily consider sampling methods and sample size, which is different with quantitative research. The important issue behind qualitative research is to select participants or sites that can help researchers to answer their research questions.

After sampling, the next important aspect to consider is data collection methods. Creswell (2003) identified four data collection methods that are commonly used in qualitative research.

1. Observation is the method that is used to directly note the behaviours and activities of individuals on site

2. An interview is the method to capture the opinions of participants through face-to-face communication or by using supporting facilities such as the telephone or Skype. Interviews can be done personally or in a group, an approach which is known as focus group discussion.

3. Data in qualitative research also can be collected from documents. There are several types of document that can be a source of data, such as: newspaper,

official reports and letters.

4. Audio and visual materials such as: photographs, videos and sounds recordings can also be used as data sources.

Having gathered the data, the following step is data analysis. The choice of data analysis methods depends on the data that has been collected whether quantitative or qualitative. Before moving to examine data analysis techniques, it will be helpful to have a deeper understanding of the meaning of quantitative and qualitative data. Table 3-3 shows the distinctions between quantitative and qualitative data.

Table 3-3 Distinctions between quantitative and qualitative data (Saunders et al., 2012)

Quantitative Data	**Qualitative Data**
Based on meanings derived from numbers	Based on meanings expressed through words
Collection results in numerical and standardized data	Collection results in non-standardized data requiring classification into categories
Analysis conducted through the use of diagrams and statistics	Analysis conducted through the use of conceptualisation

Saunders et al. (2012) mentioned that once quantitative data is collected, it is usually in the form of raw data that provide only little meaning to most people. Therefore, the data need to be processed to make it useful. There are several alternative techniques for quantitative data analysis that will turn data into information. In general, these techniques involve statistical calculations, chart and table presentation. Calculations range from simple, such as frequency of occurrence, up to complex calculations such as statistical modelling.

According to Creswell (2003), data analysis in qualitative research involves four general steps as follows.

1. Organising and preparing the data to be ready for data analysis. In this step the data is arranged in different ways, depending on type of data and method of analysis going to be used. An example of this step is transcribing information for the data that is collected through interviews.

2. Reading or observing through all the data to get familiar with the information and to get a sense of what is contained in the data.

3. Start to analyse the data by coding process. Coding in qualitative data analysis was defined by Bryman and Bell (2011) as 'the process whereby data are broken down into component parts which are given names'.

4. Using coding process to identify the themes, beyond this step, researchers can explore more additional analysis such as developing themes into a theoretical model.

5. Advance discussion on the themes is undertaken to provide deeper understanding about the research findings

6. The final step of qualitative data analysis is interpreting the research findings. It can be based on the researcher's personal interpretation, comparison with information from the literature, existing theories or any combination of the three.

3.4 JUDGING THE QUALITY OF RESEARCH

Various ways to collect and analyze data have been discussed. When the study has been completed and the results were published, the first concern of readers or users, before using the results of any research, is whether or not the results are valid; do the results represent the real situation? Therefore the criteria for judging the quality of research become an important issue for researcher in conducting research project.

Bryman and Bell (2011) considered reliability, replication and validity as the most salient criteria to evaluate the accuracy of business and management research. Among these three criteria, they mentioned that reliability is very close to replication. Moreover, Collis and Hussey (2003) considered replication is a process to test the reliability.

Validity is the other criterion which is considered as important to assess the accuracy of research findings. Validity is concerned with the accuracy of the results from a piece of research representing the real situation under study (Collis and Hussey, 2003, Bryman and Bell, 2011, Quinlan, 2011).

3.5 THE RESEARCH METHODOLOGY ADOPTED IN THIS STUDY

This research aims at investigating CE for contractors and developing a model designed to assess the capability of contractors to implement CE. The research method adopted to achieve this aim is presented in the following sections.

3.5.1 Literature Review

The literature review is the vital initial step in carrying out a research project. It provides the basis of research question justification and the research design preparation (Creswell, 2003, Bryman and Bell, 2011). In addition, Saunders et al. (2012) clarified that a literature review is not just to describe and summarize the findings from identified literature sources. Such a review must be done critically to identify the concepts, theories and arguments that are related to the research questions but are unclear, biased or inconsistent; therefore they need to be studied further. The critical literature review is not just an early activity, but it needs to be done continuously throughout the research project's life.

This study has conducted the literature review to identify a gap in the existing contractor related research and to define the parameters and existing research frameworks that are related to the research aim and research objectives of this study. Then literature review was carried out continuously throughout the study.

The critical literature review started from the previous studies on entrepreneurship. At this stage, it was found that entrepreneurship can be implemented both at individual and corporate levels. This study is focused on CE to improve contractors' business performance because contractors are construction companies which run their businesses under specific circumstances, such as high levels of competition, high risks and high need of innovation; CE has been 'promoted' as one way to provide positive influence leading to business success.

The literature review focuses on CE in a general context as well as in construction. It was found that CE has not been explored in the construction management research, although CE dimensions were investigated individually. Part of

the literature review in this study specifically focused on the Indonesian construction industry, in order to gain an overview of the circumstances underlying this study.

The literature review also indicated that to develop corporate strategy based on CE, it is necessary for companies to assess their entrepreneurial nature in order to identify the discrepancy between their existing and target entrepreneurial characteristics. Therefore the literature review was continued to inform the conceptual development of the CE assessment model; however the tools to measure CE weren't developed for comprehensive assessment. The whole process of literature review in this study is illustrated in Figure 3-7.

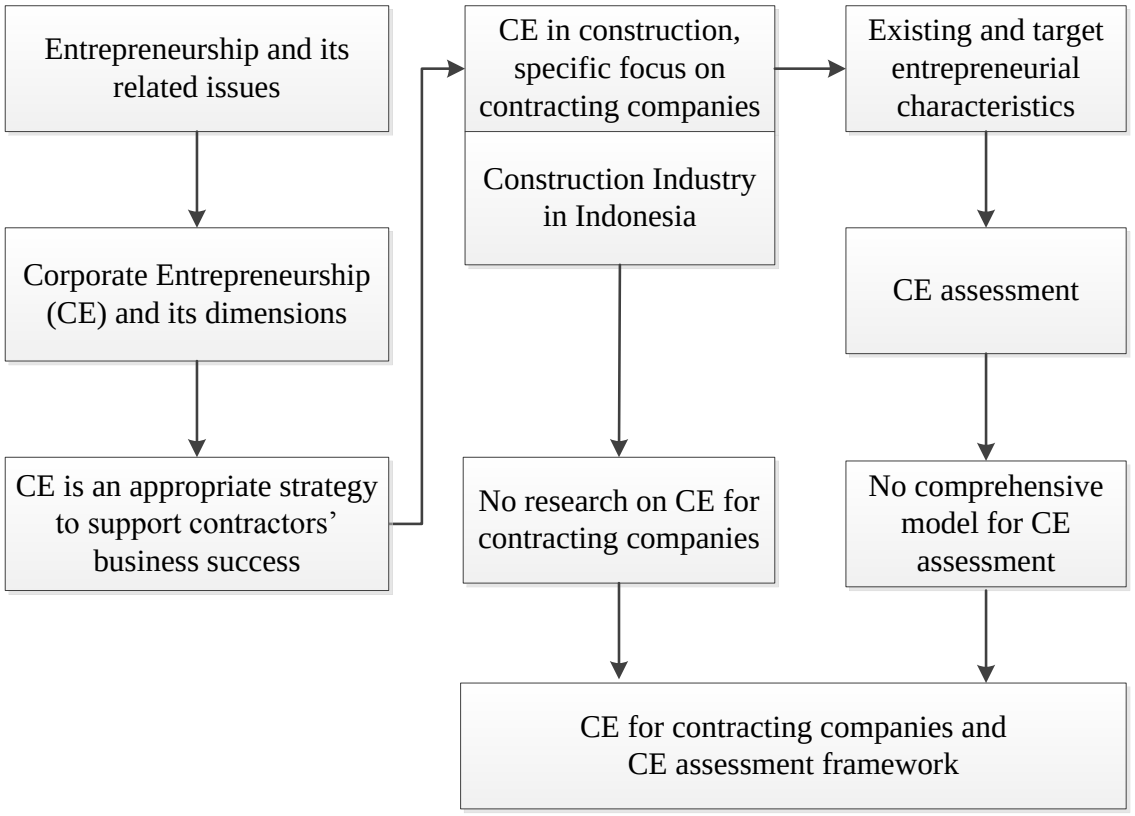


Figure 3-7 The literature review for this study

3.5.2 Research Philosophy and Approach

In the initial stage of research, the researcher needs to consider the philosophical background of the research and research approach. These two issues are important because they will underlie the choice of data collection technique and data analysis procedure. Research needs a solid base because without it, the research will not run

properly.

This study will be carried out based on constructivism and interpretivism. Constructivism is a research philosophy that considers social phenomena as a consequence of social actors' behaviour which is constantly changing, while interpretivism informs research based on human behaviour and feelings rather than visible facts.

The philosophical backgrounds of this study are in accordance with constructivism and interpretivism. The implementation of CE for contractors is explored from the experiences and opinions of Indonesian contractors' top managers. Therefore the findings are not independent from the actions of contractors' top managers; but are related to their behaviour and feelings rather than the visible facts.

Another issue underlying research design is the research approach. This study is designed based on an inductive approach, where theory is built up from research findings. Induction is the appropriate approach for this study, because CE for contractors is explored based on the collected data rather than theoretical analysis and the researcher is deeply involved in the data collection and data analysis processes.

3.5.3 Methodological Choice

After deciding the research philosophy and research approach that will be applied in this study, the next stage is research design. Research design will begin by selecting an appropriate methodology which has the ability to answer the research questions of this study.

There are three alternatives methods to carry out research: quantitative, qualitative and mixed. These methods are often distinguished by the presence of numerical and non-numerical data but in fact this criterion is insufficient. The choice of research method is related to philosophical assumption, as well as research approaches that logically underpin the research question formulation. Due to lack of previous research in the area of this study's interest, an exploratory approach was found necessary to investigate the implementation of CE by contractors. For this reason, the researcher has chosen the qualitative method to be adopted to answer the research question. The qualitative method will be applied to explore the implementation of CE

by contractors in Indonesia and to generate CE's key factors.

Another important issue that needs to be determined in this study is it's time horizon, the period over which data collection will be undertaken. This study will be conducted based on a cross sectional time horizon, using data that is collected from several contractors in Indonesia through interviews in a certain time.

3.5.4 Data Collection

The two important aspects that need to be considered and planned for data collection are selecting a sample population and organizing the data collection process. This section describes two crucial aspects of data collection: sample and data collection process.

3.5.4.1 Sample

The important issue in selecting a sample for qualitative research is not a sample size but rather on how to choose the right people who will be able to provide the necessary information correctly (Creswell, 2003, Silverman, 2011). Considering this issue, this study adopted a judgmental sampling technique for selecting the research sample. According to Quinlan (2011), the judgmental technique determines the criteria for potential participants by considering the capacity of participant to provide proper information that is relevant to the issues under investigation.

The sample for this study is top managers of contractors in Indonesia. They are chosen because they are the people who are intensively involved in planning, developing and implementing regulations, policies and programmes of the contractors; therefore they are the most knowledgeable people about the condition of their companies, and all strategic information is in their hands.

In addition, personal criteria and organizational criteria are also considered for choosing the right interviewees. The personal criteria are related to position and working experience in construction industry, while organizational criteria are related to the number of employees and ownership of contractors where the interviewees are employed.

Top managers of contractors who will be interviewed should be at the minimum position of general manager or equivalent, with working experience in the construction industry of at least 15 years. The consideration to determine these criteria are that peoples in this position are intensively involved in planning, developing and implementing regulations, policies and programmes for the companies; therefore they are the most knowledgeable persons about the condition of their companies and all strategic information is in their hands.

The companies where the respondents are employed vary in size and ownership. The ownership of contractors can be private or state. Therefore, information obtained will represent various classes and ownerships of contractors. This study includes interviews with 19 top level managers of 18 contractors in Indonesia. The variations in size and ownership of the contractors are indicated in Table 3-4.

Table 3-4 Sizes and ownership of contractors

Ownership	**Numbers of employees**			
	<100	**100 – 500**	**500 – 1000**	**>1000**
Private	4	3	4	3
State	-	1	1	2

3.5.4.2 Data collection process

After the participant sample is selected, the next step is designing data collection. Data collection in this study is aimed to gather information, experiences and opinions from contractors on the implementation of CE in running their business. Due to lack of previous research in the area, an exploratory approach was found necessary to investigate the implementation of CE by contractors and to identify the key factors for successful CE. The exploratory approach is implemented by explaining CE's into its five dimensions: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking. Therefore specifically the data collection in this study is aimed to gather information on:

1. Freedom and independency that are provided to the staff as a team or indvidually in order to support the achievement of company goals

2. The strategies and actions to outperform the competitors in order to be successful in competition

3. The effort to introduce innovation to increase competitive advantages

4. The proactive actions to seek opportunities in order to survive and grow

5. The company's bold actions to carry out risky activities under uncertain conditions and with uncertain results.

The next step is deciding the techniques to collect the data. In accordance with the choice in the previous stage that qualitative method is carried out in this study, the data collection technique is focused on qualitative data collection. Creswell (2003) mentioned that data for qualitative research can be observation data, interview data, documents data and audio visual data.

Compared to other qualitative methods, the interview is considered as the most effective method explore someone's ideas, because this method is straightforward, flexible, adaptable and controllable (Oppenheim, 1992). An interview also gives a chance to the researcher to collect valid and reliable data that is relevant to the research question (Saunders et al., 2012).

Quinlan (2011) explained several other advantages of interviews. The interviewer has a chance to explore the opinions and the experiences of the interviewee in-depth, therefore information about the phenomenon under investigation can be obtained in a managed way and in detail. Also interviews can reduce or prevent misunderstanding on the issues being discussed, because the researcher has a chance to introduce and explain the issues to the interviewees directly, and ask for clarification from the interviewee on the issues discussed via follow-up questions. The researcher also has a chance to rectify or to redirect the discussion if it moves away from the topic.

On the other hand, interviews also have some disadvantages. There are some constraints to arrange interview such as adjusting interview schedules, appointments needing to be reschedules and the interview method being time consuming (Robson, 2002). There are some other disadvantages regarding interviews in addition to scheduling the interview. Quinlan (2011) mentioned face to face interviews also have a potential problem related to the influence of interviewer on the interviewee's answers or the interviewer leading, or being tempted to lead, the interviewee's responses.

This study was affected by the issue of time constraint when arranging the interviews. Changes in the interview schedule at the last minutes and conflicts between interview schedules were the main problems when arranging interviews. Through negotiation and the personal approach, the interviews were able to be conducted as planned. The only problem due to time constraint was the extension of time for data collection.

The influence of the interviewer on the interviewees' responses did not affect the interviews in this study. This problem can be minimized or avoided because the interviewer is aware of this possibility and keeps it in mind not to interfere with the interviewees' answers.

In addition, the experience of conducting interviews for this study revealed the personalities of interviewees such as arrogant, introverted and over-confident; traits which did not necessarily facilitate the interview process. In some cases these characteristics led to the interviews not going well and negating the purpose of the interview. Arrogant people tend to boast and not answer the questions properly; introverted peoples answered the question only as needed, with minimal input and without any attempt to explore the issue further; overconfident peoples tended to overestimate the positive condition or aspects of their companies. These problems can be overcome by the researcher firmly bringing back the interviewees to the topic to be discussed, despite the interviewees' attempts to repeat and to revise the questions.

Qualitative interviews can be conducted on an individual basis or a group basis. The individual basis is one-to-one interview between interviewer and interviewee. Alternatively an interview can take place between interviewer and a group of interviewees. This method is usually considered as a focus group discussion. It is also important to consider whether interviews will be conducted face-to-face or through the communication media such as telephone, internet or Skype. How the interview will be conducted usually depends on the preference of the people to be interviewed (Creswell, 2003, Easterby et al., 2008, Blaikie, 2010, Bryman and Bell, 2011, Saunders et al., 2012).

Taking into account the position of interviewees, as top managers of their companies, all of them are the busy peoples with very tight schedules; it would have been impractical and unrealistic to have attempted to unite them together in one table for a focus group discussion. Another issue to unite top managers from different

contractors in one forum for discussion is the freedom and the comfort of them to express their opinions and to share their experiences. Therefore, it is feared that in focus group discussion, the information obtained will not be optimal and honest. Therefore personal interview were found to be the most appropriate way to collect data for this study.

Bryman and Bell (2011) mentioned there are two main types of interview in qualitative research: the unstructured interview and the semi-structured interview. In semi-structured interviews, the researcher prepares a list of key questions to guide the interview, although it is possible that some questions will be skipped and some additional questions will be raised during the interview. Usually semi-structured interviews are conducted in a more formal manner than are unstructured interviews. In an unstructured interview the researcher does not prepare predetermined questions to guide the interview, but offers the interviewee the opportunity to talk freely about their understanding, experience, and opinions regarding the topic being studied.

Therefore semi-structured interview with face-to-face basis was chosen as the data gathering method for this study. The semi-structured interview was preferred to the unstructured interview due to the ease of the interviewer to direct the focus of interview onto the topic; however, the interviewees still have the opportunity to express their opinions freely. The face-to-face approach provides the opportunity for the interviewer and interviewees to interact more intensively. However, this approach created difficulties because of the interviewer needing to meet the interviewees who live in different cities, therefore this kind of interview is time consuming and costly.

The semi-structured interviews were conducted with top managers of contractors in Indonesia during July to September 2013. In order to obtain optimum results from the interviews, an interview guide was prepared and supplied to the interviewees by e-mail prior to their interviews.

The interview guide consisted of three parts. The first section aimed to obtain information on the background of the interviewee. It consists of questions about the respondent's current position and working experience in construction, also the number of employees, as well as the age and the ownership of the company. The second section comprised of 27 questions, which were prepared to explore the implementation of CE in Indonesian contractors. The third section, consisting of two questions, was aimed at getting the view of top management on the implementation of CE. This section

investigated whether or not CE was important to support the success of their business, and whether or not they applied CE in their company.

The main 27 questions in the interview guidelines were prepared based on five dimensions of CE: autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness (Lumpkin and Dess, 1996). Each dimension was explored further based on several references that are related to those dimensions, such as the three characteristics for CE (Miller 1983), strategic management of small firms (Covin and Slevin 1989), entrepreneurial orientation of emerging young high-technology firms (Hughes and Morgan 2007), organization innovativeness in high-tech industry (Tsai et al 2008). The interview guidelines can be seen in Table 3-5.

The location for the interview was the interviewees' office with consideration of their convenience and time efficiency. The format and sequence of questions did not always expressly follow those outlined on the interview guidelines; they varied depending on the flow of the conversation. Extra questions were asked in cases where the interviewees mentioned issues which appeared to be important and relevant to the topic of the interview and the interviewer found it beneficial to explore further. The interviewer controlled the conversations and made sure the focus stayed on the topic. The duration of each interview varied from 60 to 90 minutes.

The interviews were fully audio-recorded with the permission from the interviewees. Fully audio-recorded interviews are intended to optimize data capture and to allow researchers to be more concentrated on the process of interview, later the results of each interview session can be listened to as often as needed.

The interviews were fully transcribed to facilitate the data analysis. Transcribing was done as possible after the interview to avoid the accumulation of work after all interviews are carried out. The transcript of each interview was saved in a separate file and the file name was not the name of interviewee; a tactic in order to guard confidentiality. The statements of interviewer and interviewee were distinguished clearly by stating the name of declarant in each statement.

Table 3-5 Interview guidelines

INTERVIEW

CORPORATE ENTREPRENEURSHIP FOR CONTRACTORS

GUIDELINES

This interview will explore the implementation of corporate entrepreneurship (CE) in your company, either its implementation has been realized or not. The implementation of CE in this interview will be explored based on five dimensions of CE: autonomy, innovativeness, risk taking, proactiveness and competitive aggressiveness

The interview will be conducted based on a semi-structured face-to-face approach. The following questions are prepared only for interview guidance, therefore the interview will not be limited to only answering these questions; however they can be explored further.

The interview will be fully audio-recorded with the permission of interviewees and the identity of interviewees will be kept confidential.

RESPONDENT'S BACKGROUND

1. What is your current position in this company?
2. How many years do you have experience in running a construction business?
3. How many permanent employees are working in your company?
4. When was this company started up?
5. What is the ownership of your company?

GUIDANCE QUESTIONS FOR INTERVIEW

1. How does the company manage working procedures and direct the thinking of the employees?
2. How is the company's policy in terms of decision-making that should be made by the employees?
3. How does the company provide an opportunity for employees to pursue a business opportunity?

4. How does the company's policy determine employee's targets?
5. How does the company manage the mechanism of communications?
6. What is the company's mechanism in terms of information access by the employees?
7. Mention some of other things related to the implementation of autonomy within the company?
8. How are the new technologies and methods promoted by the company?
9. How does the company support its R & D programme?
10. How does the company encourage the employees' creative ideas?
11. What innovation has been done in this company?
12. How are the customers' demands understood and responded to?
13. How are the efforts being made to increase the company's image?
14. Mention some of other implementations of innovativeness within the company?
15. How are the efforts to become a leader among all competitors in introducing new ideas?
16. How are the new ideas introduced to the community?
17. How are the efforts to master the needs and trends of the market?
18. How are the efforts to control the local and global markets?
19. Mention some of other proactive actions done by the company?
20. What is the company's attitude toward high-risk projects that might give many advantages?
21. How does the company respond to opportunities with uncertainty?
22. How is the company's policy on using the money to acquire a potential solution?
23. Mention some of other risk taking behaviours done by the company?
24. How does company respond to the strategies adopted by its competitors?
25. How does company respond to the competition with competitors?
26. How does company 'undo-the- competitor' posture?
27. Mention some of the other aggressive actions done by the company in dealing with its competitors?
28. Is CE considered as an important strategy to be implemented in running your company?
29. Can we consider this company as the company that has implemented a CE strategy?

3.5.5 Data Analysis Procedure

After data has been collected, the following step is data analysis. According to Saunders et al. (2012), the determination of the method for analysing qualitative data can be approached from either an inductive or deductive perspective. As explained earlier, this study implements the qualitative method which is based on an inductive approach. Therefore this study uses less structured procedures and relies more on the researcher's interpretation in analysing the data. Data analysis that is adopted to reach the aim of this study is explained in following sections.

3.5.5.1 Key factors identification

Key factors of CE implementation in contractors are identified from qualitative data that is collected through interviews. Creswell (2003) proposed the generic steps for qualitative data analysis. The process started from organizing and preparing the qualitative data to be ready for analysis. For this step, Silverman (2011) proposed data from interviews that has been audio-recorded should be transcribed in order to provide an excellent record of each interview. Furthermore, Saunders et al. (2012) gives some clues for better results of transcribing data. The interview should be transcribed as soon as it has happened, rather than waiting until all the interviews are carried out, in order to avoid the accumulation of work. The transcript of each interview should be saved in the separate file with the different file name and the file name should not be the name of interviewee, in order to maintain the confidentiality. Transcripts should distinguish between the statements of interviewer and interviewee; therefore the speakers should be identified clearly in the transcript. All interviews in this study were audio-recorded then fully transcribed. All requirements to obtain a better result as described above have been fully considered.

Following data preparation, Saunders et al. (2012) proposed several steps for data analysis. The procedure starts by categorizing data, then rearranging categories, and finally reporting results. Data in this study is categorized by a coding process. According to Bryman and Bell (2011) coding is a tool for aiding the data management and intrepretation that helps researchers to figure out the meaning of data. Coding in qualitative research can be defined as a process to break down data into component parts and then give the names of each category. Data coding is different to data intrepretation but coding will help researchers to interpret the findings from the data. Strauss and Corbin (2008) distinguishes coding into three types: open coding, axial

coding and selective coding. This study focuses on selective coding as the most common coding in qualitative research, in which the core category or central issue revealed by the data is determined.

Later, thematic analysisis was used to analyse the results of coding process. Braun and Clarke (2006) defined thematic analysis as ‘a method for identifying, analysing and reporting patterns (themes) within data’. A theme is defined as important points that were captured from the data related to the research question. Thematic analysis offers two main ways to identify themes: the inductive or bottom-up approach and the theoretical or deductive approach. An inductive approach is data driven where the themes emerge from the data and are not driven by the theoretical interests of the researcher. However, with the deductive approach themes emerges from the theoretical interests of the researcher. This study adopted the thematic analysis inductive approach, which means key factors of CE are identified from the data that is collected from the interviews.

Categorising data is the process that is done continuously. It may lead the researcher to rearrange the data. During the process the researcher may subdivide one category into other lesser categories or integrate some categories into one larger category, as well as creating new categories or deleting existing ones. Consequently researchers must always update the names and definitions of the identified categories. Data rearrangement is conducted in this study until a final set of indicators is obtained.

The following processes were carried out to analyse the data in order to identify the key factors of CE.

1. The analysis started by reading the transcript twice, which enabled the researcher to be familiar with the data and to catch initial ideas from the data.
2. It was followed by the coding stage. The first coding was done manually by examining the transcript carefully line by line. Sentences and paragraphs that indicated a potential pattern of key factors were highlighted manually. In this stage, the researcher tried to code as many phenomena as possible that emerged from the interviews.
3. The next step was refining the coding process and re-categorising the codes into appropriate nodes using NVivo 10 software. Nodes in thematic analysis are considered as themes which are used as key factors of CE in this study. In this

stage, the initial list of key factors was generated across the data set, and the provisional name for each key factor started to be created.

4. Refining the coding process, re-collating the codes into appropriate themes and reviewing the name of each theme were continuously done to check whether the factors work in relation to the entire data set or not. This stage was done in three rounds using NVivo 10 software. As a result, new themes have been found and some existing themes have been dropped, combined, and re-named in each round. Finally the list of key factors of CE for contractors was identified.
5. After a set of key factors was identified, the next step is providing the definition of each factor and then the important issues behind each key factor were explored. This step was carried out by examining carefully the statements in each code to catch the important message behind each key factor.

Finally data analysis resulted in identification of a set of key factors of CE for contractors.

The relationships between these key factors were also identified in order to provide better understanding about each key factor, and to find out their contribution to the CE of contractors. The analysis was done using coding density function in Nvivo 10 software. The process to identify the relationships between key factors will be explained later in Chapter 4.

3.5.5.2 Development of model

This study aimed to develop capability model based on CMM framework that was initially developed for a software company by the Software Engineering Institute, Carnegie Mellon University in 1991. CMM for software is a model to guide software companies to select a strategy to control and to improve the process of software development and maintenance (Paulk et al., 1993).

CMM proposes two different approaches for process improvement in its maturity model, which are called representations. These two representations are named staged and continuous. Staged representation focuses on the maturity level of an organization's overall performance, while continuous representation focuses on the capability level of each process area. Capability levels indicate the achievement of process improvement in individual process area, while maturity levels indicate the process improvement achievement of the organization across multiple process areas.

Both representations use the same process areas but they are different in application. Continuous representation classifies process areas based on similar categories and defining capability levels in each process area, for example: process area 1 is at capability level 3; process area 2 is at capability level 4, and so forth. Staged representation groups process areas by maturity level, therefore this representation indicates which process areas should be implemented to achieve each maturity level, for example process areas 1, 2, 3 and 4 should be implemented to achieve maturity level 1, process areas 5, 6 and 7 should be implemented to achieve maturity level 2, and so forth.

This study develops CECM with continuous representation instead of staged representation. Contractors implement all key factors of CE but at different capability levels, instead of implementing only a set of particular key factors in order to achieve certain maturity level.

The key components of the proposed model include:

1. Process areas that were considered as 'indicators' in this CECM

   Twenty one key factors of CE that were found in this study are considered as indicators of CECM.

2. Capability level

   Four capability levels are used in CECM: 'initial', 'repeatable', 'managed' and 'optimized'. These capability levels are fit for CECM because the implementation of every indicator in CECM can be ranging from not performed at the lowest level up to defined properly in contractors standard and continuously improved at the highest level.

3. Framework matrix

   CECM is developed in the form of a matrix, where four capability levels are positioned in the headings of each column and 21 indicators are positioned in the first column of the matrix. Then each cell within the matrix provides detailed descriptions of each assessment criteria for each indicator at each level.

3.5.6 Model Validation and Evaluation

After the model has been developed, the next issue is related to judging the

quality of research findings. In order to meet the criteria of quality of qualitative research, this study provides deep description on the process and findings of research. Details and deep description about research process and research findings will provide the readers with an idea about the applicability of this research.

The particular circumstances of this research are not related to the observation, not trying to distinguish the public and private opinions, and not checking the consistency of people's opinions over time. For this reason, two approaches to validate the model are chosen: an expert review that involves academics who well understand the topic and case studies with industry businesses who are involved directly with the application of the model.

3.5.6.1 Expert review

The determination of experts who will be involved in this study follows Ramirez (2002) who proposed a subject matter expert review approach. Subject matter experts are experts who have broad and deep experience of the subject under study but who are not considered as prospective respondents of the study. Subject matter experts can be found from several sources such as government officers, academia, and members of professional organization.

This study used ten academics as subject matter experts to review the CECM because they have a knowledge related to the topic of this study, but they are not considered as a potential respondent because they are not directly involved in the contractor business. In addition, the choice of academics to be the experts to review the model also needs to consider time availability and source accessibility. Academics usually have a high interest in research and they are quite flexible when it comes to arranging their schedules.

In this method, experts who have an extensive knowledge on the model are asked to give opinions, suggestions and comments on it. Then the inputs from experts will be used to evaluate and refine the model. Expert reviews were adopted to evaluate the models that were developed in the previous studies such as: Bassioni et al (2004, 2005), Xiao-Hua and Ling (2005), Meng et al. (2011), Angkananon et al. (2013).

The expert review in this study was conducted through face-to-face, person-to-person focus group discussions and interview, in order to gather comments and constructive suggestions from the experts on:

1. The key factors of CE that were identified and defined in this study to represent the implementation of autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking of contractors

2. The criteria that were defined in each indicator at each level to measure the capability of contractors to implement CE

Then based on the inputs from the experts, the model is evaluated and refined.

3.5.6.2 Case studies

The model is also evaluated in term of its practical application. Case study is the method that is chosen to apply and to examine the proposed model in practice. Yin (2009) mentioned that case study can be applied to investigate research in many situations, many areas and at all levels. Research based on case studies is often found in many areas such as: psychology, sociology, business, education, nursing; at individual, small group, organizational or community level. This method gives an opportunity to researchers to investigate and understand in depth the phenomenon of real life events.

The case study in this study is intended to measure the capability level of contractors to implement CE and to explore the implementation of each indicator in detail in every participating contractor. The case studies in this study are mainly directed to assess the practical applicability of CECM. By applying CECM in the real world of contractors, the problems that emerge from the application of the maturity model can be identified. Later on based on the experience in the case studies, the model can be refined and the practical applicability can be maximized.

This study uses mix method in the case study. Quantitative data is collected through a questionnaire that is based on the developed CECM. The questionnaires are distributed to the staff of contractors in Indonesia to be filled based on their experiences and knowledge about their company. In addition, discussions take place with the participants in order to ensure that they have answered the questions correctly and honestly and to explore the implementation of each indicator further.

Through the case study, several inputs can be gathered. During filling out the questionnaire and discussion, the comments and the questions from respondents are a useful input to refine the model. The consistency of assessment results indicate the appropriateness of the model to measure what is supposed to be measured.

3.6 SUMMARY

This chapter provided a picture of the research design and methodology that are adopted in this study. This study starts by generating the initial idea about the topic that will be studied in this research. Then this idea was refined by reviewing related literature. From the literature review, a research gap was found and the research question was defined.

The challenge that follows this initial stage of research is how to find the suitable way to answer this research question. This study adopted the concept of research onion proposed by Saunders et al. (2012) as an outline guide to research methodology.

Based on the stages in the research onion, this study adopted constructivism and interpretivism as a psychological background, and inductive as a research approach. These two stages are considered the foundation of the research to be undertaken in this study. The following stage is research design, where qualitative research method was chosen. The data for this study is collected at a particular time, therefore cross sectional paradigm is considered as a time horizon for this study.

Data for this study is collected through semi-structure interviews of top managers of contractors in Indonesia. Then the data is analyzed followed the step for qualitative data analysis. Thematic analysis is the method for identifying indicators and then the CECM is developed, based on the framework of CMM.

After the model has been developed, the quality of this model is assessed using expert review method. Then the practical application of this model is assessed using case studies involving three contractors in Indonesia.

Chapter 4 - CORPORATE ENTREPRENEURSHIP FOR CONTRACTORS

4.1 INTRODUCTION

This chapter is focused on investigating the implementation of CE in contractors. In particular, key factors are generated to systemize the findings on CE in contractors. CE will be explored in detail through the experiences of the contractors in Indonesia through five dimensions of CE.

The details processes for examining and exploring CE in contractors are presented in this chapter; beginning with the process of how the data was collected, how the data was analysed and finally how the conclusion was drawn. The key factors and their deep explanations as well as the relationship between key factors, are presented to show particular issues of CE for contractors.

4.2 THE PROCESS OF CORPORATE ENTREPRENEURSHIP KEY FACTORS DEVELOPMENT

The process key factors development consists of two main stages: data collection and data analysis. The overall process of key factors development can be seen in Figure 4-1.

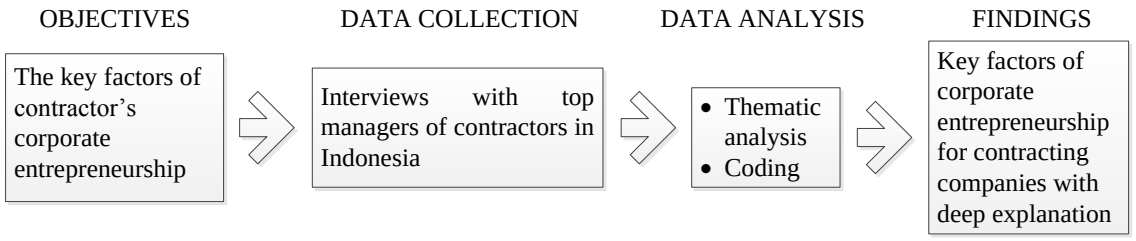


Figure 4-1 The process to explore CE for contractors

4.2.1 Data Collection

The data collection in this study is carried out in stages, started from planning, implementation and post-data collection stages as has been explained previously in Chapter 3. The whole process of data collection and the explanation of each stage can be seen in Figure 4-2.

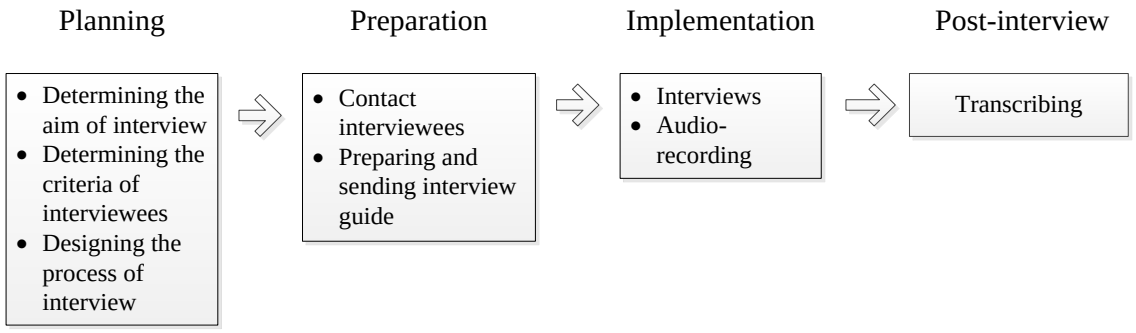


Figure 4-2 The process of data collection

4.2.2 Profile of Respondents

Twenty two top level managers from 21 contractors were interviewed. Three of the interviewees were not included in the data analysis. One of these excluded interviewees did not address any of the questions asked of him and it was not possible to bring him back to the discussed topic despite the attempts to repeat and to revise the questions. Two interviewees were excluded as they get their projects because of their 'special relationship' with the clients; therefore, they didn't implement any entrepreneurial characteristics in running their business. Therefore, data analysis was carried out using the information gathered from 19 interviewees from 18 different contractors. Two interviewees working in the same contractor were interviewed individually at different times.

The profile of interviewees and the companies can be seen in Table 4-1. The profile covers current position and working experience of interviewees as well as number of employees, ages and ownership of contractors. Based on number of employees, the contractors are distinguished into four classes: less than 100 employees, between 100 to 500 employees, between 500 to 1000 employees and more than 1000 employees.

Table 4-1 The profile of interviewees and their companies

NO	PERSONAL		COMPANY		
	Position	**Working Experience (years)**	**Size**	**Ages (years)**	**Ownership**
1	President Director	22	>1000	45	Private
2	President Director	27	500-1000	41	Private
3	President Director	31	500-1000	47	Private
4	President Director	21	100 - 500	21	Private
5	Vice President Director	27	>1000	54	Private
6	Director	24	>1000	45	Private
7	Director	23	>1000	21	Private
8	Director	28	500-1000	31	Private
9	Director	21	100 - 500	24	Private
10	Director	21	100 - 500	21	Private
11	Director	18	<100	18	Private
12	Director	27	<100	27	Private
13	Director	11	<100	11	Private
14	General Manager	20	>1000	42	State
15	General Manager	15	100 - 500	35	State
16	Branch Manager	27	500-1000	44	Private
17	Branch Manager	23	<100	18	Private
18	Manager	18	500-1000	42	State
19	Corporate Secretary	26	>1000	54	State

4.2.3 Data Analysis

Thematic analysis with ‘bottom up’ approach was used to develop key factors of CE. In which themes are identified mainly based on the data. (Braun and Clarke, 2006). In order to identify the themes, the data that was collected through interviews is categorized through a coding process as explained earlier in Chapter 3.

After the key factors were identified, the next step is providing an explanation of each key factor to clarify the meaning of each key factor by rising from the statements that were coded in every node. Later the important issues that were signage in each key

factor were caught and presented to accompany the definition of each key factor. The important issues behind key factors were presented in order to provide deeper and better understanding about those key factors, as well as about the implementation of CE in contractors. The data analysis process that has been explained in Chapter 3 was depicted in Figure 4-3 to provide a clearer picture of data analysis in this study.

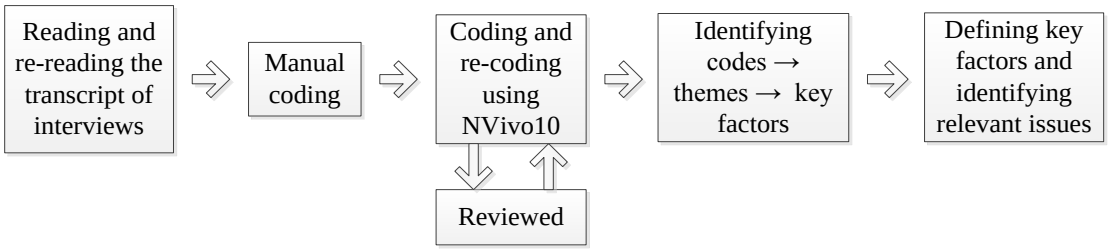


Figure 4-3 The process of data analysis

4.2.4 Examples of Coding

This study used a thematic analysis bottom-up approach, therefore; coding process was done by clustering together statements which are related to the similar issue in one node or theme. Then based on all codes in one theme, the name of the theme was determined and then the definition and the important issues of each theme were identified to provide better and deeper understanding about the themes that later on were considered as key factors.

In order to give an idea about the coding process, the example of coding for one key factor named 'acting as problem solver for clients' is explained in this section. This example showed statements that are related to how contractors involve in client's problems and what they do to solve those problems. The codes that are presented here is the output of Nvivo 10 Software.

<Internals\\Interview\\CBM> - § 3 references coded [1.26% Coverage]

Reference 1 - 0.18% Coverage

We are involved in design and give input to the owner

Reference 2 - 0.50% Coverage

We know where is a good location and where is not. Sometimes the land allotment, we also can suggested to be changed. This land is not suitable for apartments but is more suitable for hotel

Reference 3 - 0.57% Coverage

We are open to the owner. We could say that according to me that project is not good, if you build it then cannot sell it, you will lose and you can't pay me

<Internals\\Interview\\MRD> - § 1 reference coded [0.25% Coverage]

Reference 1 - 0.25% Coverage

We made the proposal for this project, the project should be built in this way and this is the budget

<Internals\\Interview\\NKR> - § 1 reference coded [1.27% Coverage]

Reference 1 - 1.27% Coverage

Owners don't want to get a headache, they want a project, they don't want to think - I want this house but I don't want to get a headache about design, construction, spesification, please prepare it for me, if I agree, go on

<Internals\\Interview\\NRC> - § 1 reference coded [0.54% Coverage]

Reference 1 - 0.54% Coverage

We always sit together with the owner to discuss how to achieve the targets, whether cost, time, or quality, and so on

<Internals\\Interview\\AKS> - § 1 reference coded [0.36% Coverage]

Reference 1 - 0.36% Coverage

We provide a lot of conviniences with the process, in many ways

<Internals\\Interview\\TBP1> - § 3 references coded [9.44% Coverage]

Reference 1 - 5.12% Coverage

Starting to consider a customers' complaint. Why our cost for formwork in BQ is higher than the competitors. It's always risen. Then we started to think, we may need to invest, we calculated if we invest by ourselves it will be cheaper than we subcontract to other party, we can save up to 25%

Reference 2 - 1.70% Coverage

If there was a stuck payment, we reminded them, then they paid. In case already more than 2 months, we contacted them and asked them about their problem, if they have a problem we asked them what we can do to help

them. They told us about their problem and we offered them to consider that payment as a loan and they had to pay an interest. So far no problem

Reference 3 - 2.62% Coverage

Since three years ago, there is a tax regulation and this regulation annoyed the client because client should pay double tax. In this situation we find the best way to overcome this problem which is not detrimental to both parties

<Internals\\Interview\\EDS> - § 1 reference coded [0.91% Coverage]

Reference 1 - 0.91% Coverage

I serve the client, what are the client's needs, what is the client's goal. We tried to approach them

<Internals\\Interview\\GHB> - § 3 references coded [3.83% Coverage]

Reference 1 - 1.49% Coverage

Big projects, the clients' money was not enough, they asked how to manage it. So what can we do? For example we invited bankers to cooperate with the clients

Reference 2 - 1.07% Coverage

Sometimes we shared, for example project of houses, I built then I got some units. For example 5 houses, I got 2 and you they got 3

Reference 3 - 1.26% Coverage

Finally owner judged: "It seem that I more convince to this contractor. They can present more, can help more to predict what will happen, so more trusted"

<Internals\\Interview\\PKF> - § 1 reference coded [1.06% Coverage]

Reference 1 - 1.06% Coverage

We may have an idea that we can share with them, this one is better, more secure. Sometimes they themselves don't have experience that makes them forget about something important, they don't realize that their idea will be dangerous for other people

<Internals\\Interview\\JKR> - § 2 references coded [1.79% Coverage]

Reference 1 - 1.36% Coverage

Service also means to address client's challenges. For example build a

sluice under a railway. The Minister got a headache. We won a project ..... we said: be calm, we will build it, then we presented our proposal and he agree because it solved his problem

Reference 2 - 0.43% Coverage

We always give the service by providing technical proposals that can reduce their headache

After reviewing all codes in this example node or theme, issues related to the client's problems and the solutions provided by contractors were found. Client's problems are related to design, land use, budget, payment, tax, invesment and technical matters, while contractors' solutions relate to involvement in design, finding alternative resources of funds, proposing construction methods and giving ideas for invesment. Based on these findings, it was decided the name of this indicator is 'acting as problem solver for clients' and then this indicator was defined as 'helping clients to seek the best way to solve clients' problems such as technical, financial or other problems'.

Several important issues can be raised for this key factor. Contractors seek to provide useful information for the clients and to help clients to solve their problems. Clients are generally ignorant of the issues related to construction, so contractors need to provide useful information for the clients to increase their benefits by, for example, explanation of a building design, or guiding them in the selection of building materials. In addition, clients sometimes face problems related to tax issues or payments due. In these cases, contractors are required to help their clients to find the best solutions.

Similar analysis was carried out to get all key factors of CE for contractors, as well as their definitions and important issues behind each key factor.

4.3 KEY FACTORS OF CORPORATE ENTREPRENEURSHIP FOR CONTRACTORS

In the initial stage of analysis, the thematic analysis identified 36 key factors. Then refining the coding and re-collating the codes and reviewing the name of each key factor took place. At this stage, some existing key factors were dropped, some were combined, and new key factors were found. Finally 21 themes were identified as key

factors of CE for contractors. The next stage is to develop a definition and to explore the important issues of each key factor based on the codes in it.

These 21 key factors were refined based on the comments and suggestions from the experts in expert review, as well as construction professionals in case study. As a result, some changes of name and definition of the key factors were made. Final results of these 21 key factors of CE (KF) with their definitions are presented below. In addition the issues that emerged from interviews with respect to the key factors are also presented. The KF presented here are the final results after to be refining based on the inputs from expert review and case study that are presented in Chapter 6 and Chapter 7.

KF1 Autonomy for accessing information: independent action by an individual or team to access information, data and knowledge that is related to their duties, responsibilities and position

Top level managers from participating contractors have mentioned that they give autonomy to their staff to access information. This autonomy is regulated based on the position and duties of each staff member; for example, a project manager can access all information related to the project under his or her control while a site manager can only access information related to technical matters in his or her project. Autonomy to access information has been supported by the information system that is developed by each contractor.

KF2 Autonomy for communication: independent action by an individual or team to communicate both vertically and horizontally through both formal and informal forums

Contractors give autonomy to staff to communicate both formally and informally. Formal communication is made through meetings which are scheduled monthly or bi-monthly. Informal communication, on the other hand, can be made at any time to provide input, to give and receive information, or to discuss a problem. Both can be carried out either vertically between each staff at different levels or horizontally between each staff at the same level.

KF3 Autonomy for proposing suggestions that benefit the projects and company: independent action of staff members both as an individual staff member or a representative of a team to propose useful suggestions for the improvement of projects and company's performance

Autonomy is given to staff to provide a proposal that benefits the company and the project; for example, an employee proposes an opportunity to get new projects, innovations, or new business opportunities. The proposal is delivered in stages from the supervisor up to the top management; for example, from project staff to project manager, and then to the top management of the company. Staff in this key factor is defined as an individual staff or a representative of team such as branch offices and projects.

KF4 Autonomy in planning and managing projects: independent action by a project team to plan and manage projects in terms of procurement, interaction with clients, construction methods, human resources management, etc.

A project team under project manager's leadership get autonomy to plan and manage a project. Some examples of this autonomy are the autonomy to determine construction methods, equipment, sub-contractors, and also to manage a project's financial and human resources. In planning and managing a project, the project team should follow provisions that have been specified in the corporate plan. There are other limitations in the implementation of this autonomy; for instance, when it relates to the decisions that have substantial cost consequences, the project team should discuss the matter with management.

KF5 Acting as problem solver for clients: helping clients to seek the best way to solve a client's problems, such as technical, financial or other problems.

Contractors seek to provide useful information for the clients and to help clients to solve their problem. Clients are generally ignorant of the issues related to construction, so contractors need to provide useful information for the clients to increase their benefits by, for example, explanation of a building design, or guiding them in the selection of building materials. In addition, clients sometimes face problems related to tax issues, payments due, etc. In these cases, contractors are required to help their clients to find the best solutions.

KF6 Being different compared with competitors: the company is able to offer something different from its competitors through specialisation in particular projects, such as irrigation, hotels, airports etc., as well as innovation, such as construction methods, materials, etc.

To win the competition, the contractor needs to provide something new and different from its competitors. Having qualified human resources, an established financial condition, advanced equipment, reliable technology and expertise in particular projects are considered as the advantages of contractors to be superior, compared with their competitors. High commitment to serve clients, such as after maintenance period service, is another important point to beat the competition.

KF7 Building and maintaining client confidence in the company's trustworthiness and reliability: the company is trusted by clients for its reliability and honesty, such as making continuous improvement, being fully committed, not cheating, etc.

Client confidence is the key for the contractor to get repeat orders from previous clients. Repeat orders are considered by almost all contractors as a major source of projects. Client confidence can be built and maintained through clients' satisfaction with the contractor's performance in previous projects. In fact, clients are satisfied because the contractor did not attempt to deceive clients and was reliable in meeting the client's demands. Always meeting project specifications, having commitment to complete the project even if suffering a loss, and continuously improving the performance to complete the projects are some examples of contractors' efforts to gain and keep clients. This key factor has been considered as more important than offering low prices for getting projects.

KF8 Maintaining relationship with clients: the company keeps in touch with clients to establish long term relationship with the main aim of getting repeat orders

Similar to KF7, repeat orders are the main source of projects for most contractors, thereby maintaining good relationships with existing clients is considered essential, and is usually done by the marketing department. Good relationships with existing clients must be initiated from the client's trust to the contractor; then, this relationship can be developed and maintained.

KF9 Positioning on markets that are concerned about quality: the company promises better quality rather than cheaper prices compared to its competitors; therefore, it does not worry to be abandoned by a client simply because it offers a relatively higher price.

Contractors do not get involve in a ‘price war’ competition where other contractors lower the bid price to an unreasonable price in order to obtain the project. A contractor declares that it does not worry about being regarded as expensive, because it has loyal clients that are more concerned about quality than price.

KF10 Carrying out research and development activities: conducting experiments to create new products and/or services to achieve the efficiency and effectiveness of projects and to meet clients’ demands

Contractors actively get involved in research and development to create innovations in order to meet clients’ demands and achieve efficiency and effectiveness in their projects. Large contractors usually have a Research and Development (R&D) department to handle these activities with the support of all staff, each of whom is directly involved in a construction project. Small and medium-sized contractors usually do not have a R&D department; therefore, the innovations are developed by the people in a project. Companies usually support this activity as far as the budget is acceptable and the results can be accounted for.

KF11 Challenging staff to be innovative: a willingness to encourage staff to create innovations through an appropriate rewards system, such as bonus, recognition, promotion, etc. for innovators.

Contractors challenges each staff to be innovative by providing some remuneration, such as bonus, profit sharing, and points for promotion. In addition, there are contractors that regularly hold formal competitions for innovation among the project teams. Each project is required to produce an innovation; then, the most promising innovationis trialled in several projects and finally, if successful, it is set as a company standard.

KF12 Supporting programmes that spark innovation: a willingness to spark innovation through some programmes, such as hiring experts, staff training, knowledge sharing, knowledge management, etc.

Contractors conduct programmes that encourage the creation of innovations, such as hiring consultants, managing knowledge properly, organizing discussion forums for knowledge and experience sharing, providing training, and determining the target of

each project. Besides these programmes, the exemplar of top management behaviour and financial support are also considered as important factors to create innovations.

KF13 Carrying out marketing activities: actively carrying out marketing activities, particularly to obtain information about new projects and then proactively pursuing the project through some efforts, such as sending the company's profile, doing presentations, etc.

Most contractors consider their marketing division as the second important division after the project division. Large contractors usually have a marketing department, whilst small and medium contractors assign some staffs to carry out marketing activities together with their project activities. However, marketing is the task of every staff in the company; therefore, all staff are required to support marketing activities. Marketing activity for contractors is different than other businesses. Contractors have the opportunity to get the project only when the project is offered by the client; therefore, they cannot use the marketing approach for direct selling. The most appropriate marketing approach for a contractor is obtaining information about project availability and then approaching the owner by proactive actions, such as sending company profile and doing a presentation. The marketing department has the additional duty to maintain good relationships with the firm's existing clients.

KF14 Expanding market segment: looking for opportunities to get projects in new segments and new areas

Contractors should not focus on a certain segment of the market, for example developer, government or private sector only, but they should put embrace diversity by entering into different markets. In addition, expanding into new areas is also another concern of contractors, however most contractors prefer focusing on the domestic market only, due to the problems resulting from cultural and regulatory differences in the overseas projects

KF15 Looking ahead to future demands: being able to anticipate future demands and trends, such as ISO certification, Green Contractor Certification, global competition, etc.

Anticipating future demand is an important factor for contractors to maintain sustainability of their business. For example, when there was demand of ISO

certification, contractors who had anticipated the demand of green construction, took the necessary steps earlier on. Looking ahead, contractors must be prepared to enter global competition. For example, one of the contractors in this research had begun to prepare their employees to deal with international work culture. Likewise, rapid progress of construction methods that are driven by the increase of customer demands, should be anticipated in advance.

KF16 Running business diversification: looking for business opportunities and developing new businesses in the areas that are still related to the core business of the contractor, such as heavy equipment, property developer, precast factory, etc.

This factor is also referred to as the principle of 'do not put all eggs in one basket' in running the business. Most contractors began to expand their business to property development, whereas others diversified into pre-cast concrete, construction equipment, or building materials such as steel, aluminium, and glass. Since the demand for business diversification is very important, contractors provide an opportunity for all staff to propose new business opportunities, based on their experience. Most contractors are still committed to doing business related to construction rather than moving into a different area.

KF17 Risk Taking for Innovation: bold actions that have been reckoned carefully to introduce innovation, such as new construction methods, new materials, etc., to achieve the efficiency and effectiveness of projects and to meet customers' demands

Contractors in this study stated that they are willing to take a risk for innovation as far as the proposed innovations are reasonable. They realize that innovation has risks, such as financial and technical, but they also realize that innovation is required to achieve the efficiency and effectiveness of projects and to meet clients' demands. However, anticipated actions have been carried out in order to minimise the risks, such as developing innovation, gradually starting from the simplest one with the lowest cost.

KF18 Risk taking for selecting clients: bold actions that have been reckoned carefully to be awarded a project from new clients who have never had any experience of cooperating

In running a business, a contractor also faces a risk that comes from the clients, such as late payment or failure to pay, unreasonable requests, etc. These risks will increase for the projects from new clients. In this situation, it does not mean that the contractor should decline to take projects from new clients. However, some precautions such as looking for information about the client's background, assessing the current financial condition of the client, conducting internal coordination to evaluate the feasibility of the client and dividing the work into several contracts for a large project, have been done to minimize the risk to an acceptable level.

KF19 Risk taking on the financial aspects of projects: bold actions that have been reckoned carefully to accept any projects with financial risks, such as un-stable economic conditions, changes in prices or potential late payments etc.

The problems of client payment, un-stable economic conditions, changes in material prices, etc. have been identified as a project's financial risk. Some anticipative actions to reduce financial risk have been identified in this study, such as cooperating with other contractors, dividing a contract for a large project into several sub-contracts, working as efficiently as possible and including cost of risk in the bid price.

KF20 Risk taking on the social aspects of projects: bold actions that have been reckoned carefully to accept any projects with social risks, such as environmental issues, impact on society, etc.

Disturbance of the neighbourhood of the construction site and hence possible conflict with the community due to issues such as traffic disturbance and noise are considered as the social risks of a project. To reduce social risks, some precautions must be taken, such as evaluating and minimising all possible impacts of the project on the environment and community around the project, as well as recruiting local community members in the project site or engaging with local businesses.

KF21 Risk taking on the technical aspects of projects: bold actions that have been reckoned carefully to accept any projects with technical risks, such as construction method, site condition, lack of resources, etc.

Technical risk might be associated with new construction methods, new materials, projects with specific conditions, etc. A cement factory that requires a high degree of

precision, or an overpass that was built in a crowded location are two examples of projects with high technical risks. Contractors are required to carry out some strategic actions to address a project's technical risks, such as assigning an experienced project manager to any projects with a high technical risk, outsourcing a third party to carry out the difficult work, gathering each staff's ideas to solve the technical problems, as well as carrying out innovation.

Considering the five dimensions of CE that have been adopted to explore the implementation of CE for contractors, the 21 key factors are categorized into these five dimensions. The first four key factors (KF1 to KF4) are grouped under autonomy; KF5, KF6, KF7, KF8 and KF9 are categorised as competitive aggressiveness of contractors. KF10, KF11 and KF12 are categorised under innovativeness. KF13, KF14, KF15 and KF16 are grouped under proactiveness, and the last five key factors (KF17 to KF21) are related to the risk taking behaviour of contractors.

After all key factors examined further, the implementation of those key factors are mainly linked to projects and clients. This finding is in accordance with the nature of contractors' business. In order to be successful in business, contractors face two main challenges: to win the competition to get the project and to deliver the project successfully. These two challenges are mainly related to clients and projects.

To get projects successfully, marketing activities is necessary to be carried out actively (KF13). Considering closer relationship between project's staff and the client; therefore autonomy for staff to propose suggestions (KF3) including prospective projects is another key factor that supports marketing activities. In addition, expanding the market into new segments and new areas (KF14) is also considered a good strategy to increase the opportunity to acquire projects.

Another important effort to get a project is to establish and to maintain a good relationship with the clients by ensuring the clients' satisfaction and mutual trust between two parties, hopefully resulting in repeat orders as a potential source of projects. This particular condition highlights several key factors that are related to the relationship with clients such as: acting as problem solver for clients (KF5), offering something different from its competitors (KF6), building and maintaining client confidence (KF7), maintaining good relationship with clients (KF8), concerned about quality (KF9), anticipating clients' future demands (KF15).

Contractors deliver a specific and unique project based on client's order therefore they need to provide specific design and specific construction methods to meet the client's demand. Under this specific circumstance, key factors such as: research and development activities to meet the clients' demands (KF10), and encouraging innovations (KF11 and KF12) are the key factors that are directed to satisfy clients' specific demands. However, contractors also need to consider risk that follows innovation therefore risk taking for innovation (KF17) is another key factor.

Another challenge is a client's involvement during the construction process that potentially creates problems such as: unreasonable requests, changes in design and changes in material. Under this circumstance, the key factor of risk taking for selecting clients (KF18), especially new clients who have never had any experience of cooperating, emerged. KF18 also intended to another risk related to clients, such as late payment and fail to pay.

A second challenge for contractors is to deliver projects successfully. Key factors such as: research and development activities (KF10), encouraging innovations (KF11 and KF12) that previously have been considered as key factors that are related to clients, will also be associated with the challenge to deliver projects successfully. Similarly, innovation is followed by risk, therefore risk taking for innovation (KF17) is also considered as a key factor for delivering project successfully.

The other key factors for delivering projects successfully are autonomy that is associated with freedom and independence provided to the staff, especially those involved in the project. Autonomy of the project team to access information (KF1), autonomy for communication both vertically and horizontally (KF2), autonomy for proposing suggestions such as construction methods, construction materials, etc. (KF3) as well as the autonomy of the project team in planning and managing projects (KF4) are the key factors that support the success of project delivery. Due to the nature of construction, delivering projects is a risky activity therefore there are key factors that are directed to contractors to take bold actions to win projects, such as: risk taking on financial, social and technical aspects of the projects (KF19, KF20 and KF21).

In addition to two main challenges of contractors that are focused on projects as the main business, contractors should also be proactive towards business diversification (KF16) in order to survive in high competition. However, it was found that contractor's

interest in developing new business remains in the domain of the construction industry such as property development, construction material, and construction equipment.

4.3.1 Relationship between Key Factors of Corporate Entrepreneurship

After identification of key factors, the relationships between them were investigated in order to understand them better and to find out how they contribute to the CE of contractors. The analysis was done using coding density function in NVivo 10 software. The codes that had been coded in more than one node were identified and then the relationships between key factors were found.

When the relationship between key factors was explored, the nature of that relationship was also indicated by identifying a type of relationship. According to Bazeley and Jackson (2013), the relationship between nodes in NVivo needs to be identified by the researcher to show the specific kind of relationship between two entities. They mentioned that the relationship can be defined as one-way, symmetrical (two-way), or associative.

A one-way relationship demonstrates the relationship where one leaves an impact on the other in a definite direction, for example 'innovation improving productivity'. This relationship shows that innovation creates new construction methods to improve work efficiency; therefore, productivity will increase, conversely, productivity will not generate innovation.

The symmetrical relationship shows a two-way direction relationship between two entities that influence each other in a two-way manner; for example, 'reward has a mutual relationship with work performance'. This relationship illustrates that good reward will motivate staff to work better, which means their performance will be improved; on the other hand, better performance will increase the reward.

The associative direction indicates an affiliate relationship where two nodes are held both ways but do not affect each other; for example, 'innovativeness is associated with risk taking'. This relationship can be explained as 'willingness to create innovation' indicating a bold action to take a risk; but it does not encourage or lead to a bold action to take a risk. Likewise, risk taking doesn't lead to or influence willingness to create innovation but it indicates a willingness to create innovation in an organization.

An example to show the relationship between key factors is the statement "We were introduced a new method for rotating peer-head, 450 ton peer-head, it has a risk. That is innovation as well as a risk". This statement has been coded in two nodes: 'carrying out research and development activities' as well as 'risk taking for innovation'. This phenomenon shows that those two key factors have an associative relationship, meaning that risk taking for innovation occurs when the contractor carries out research and development activities.

After the relationships among all key factors were identified, it was found that the types of relationship that were found are associative and one-way relationships. The relationships between key factors are presented in Table 4-2 and Figure 4-4 to give a clear and comprehensive overview of this relationship.

Table 4-2 Relationship among key factors of CE for contractors

CODE	INDICATORS / SUB-INDICATORS	TYPE OF RELATIONSHIP	RELATION WITH
(AU)	**AUTONOMY**		
KF1	Autonomy for accessing information	Associative	KF2
		One way (→)	KF4
KF2	Autonomy for communication	Associative	KF1
		One way (→)	KF3
		One way (→)	KF4
		One way (→)	KF12
		One way (→)	KF13
		One way (→)	KF18
		One way (→)	KF19
		One way (→)	KF21
KF3	Autonomy for proposing suggestions that benefit the projects and company	One way (←)	KF2
		One way (→)	KF4
		One way (→)	KF10
		One way (→)	KF13
		One way (→)	KF16
		Associative	KF17
KF4	Autonomy in planning and managing projects	One way (←)	KF1
		One way (←)	KF2
		One way (←)	KF3
		Associative	KF11
		Associative	KF20
(CA)	**COMPETITIVE AGGRESSIVENESS**		
KF5	Acting as problem solver for clients	One way (→)	KF7

KF6	Being different compared with competitors	One way (←)	KF9
		One way (←)	KF10
		One way (←)	KF15
KF7	Building and maintaining client confidence as trustworthy and reliable	One way (←)	KF5
		One way (→)	KF9
KF8	Maintaining relationship with clients	Associative	KF13
KF9	Positioning on a market that is concerned about quality	One way (→)	KF6
		One way (←)	KF7
(IN)	**INNOVATIVENESS**		
KF10	Carrying out research and development activities	One way (←)	KF3
		One way (→)	KF6
		Associative	KF17
		One way (←)	KF21
KF11	Challenging staff to be innovative	Associative	KF4
		Associative	KF12
KF12	Supporting programmes that spark innovation	One way (←)	KF2
		Associative	KF11
		Associative	KF15
(PA)	**PROACTIVENESS**		
KF13	Carrying out marketing activities	One way (←)	KF2
		One way (←)	KF3
		Associative	KF8
KF14	Expanding market segment	Associative	KF19
KF15	Looking ahead to the future demands	One way (→)	KF6
		Associative	KF12
KF16	Running business diversification	One way (←)	KF3
(RT)	**RISK TAKING**		
KF17	Risk taking for innovation	Associative	KF3
		Associative	KF10
KF18	Risk taking for selecting clients	One way (←)	KF2
		Associative	KF19
KF19	Risk taking on financial aspects of the projects	One way (←)	KF2
		Associative	KF14
		Associative	KF18
KF20	Risk taking on social aspects of the projects	Associative	KF4
KF21	Risk taking on technical aspects of the projects	One way (←)	KF2
		One way (→)	KF10

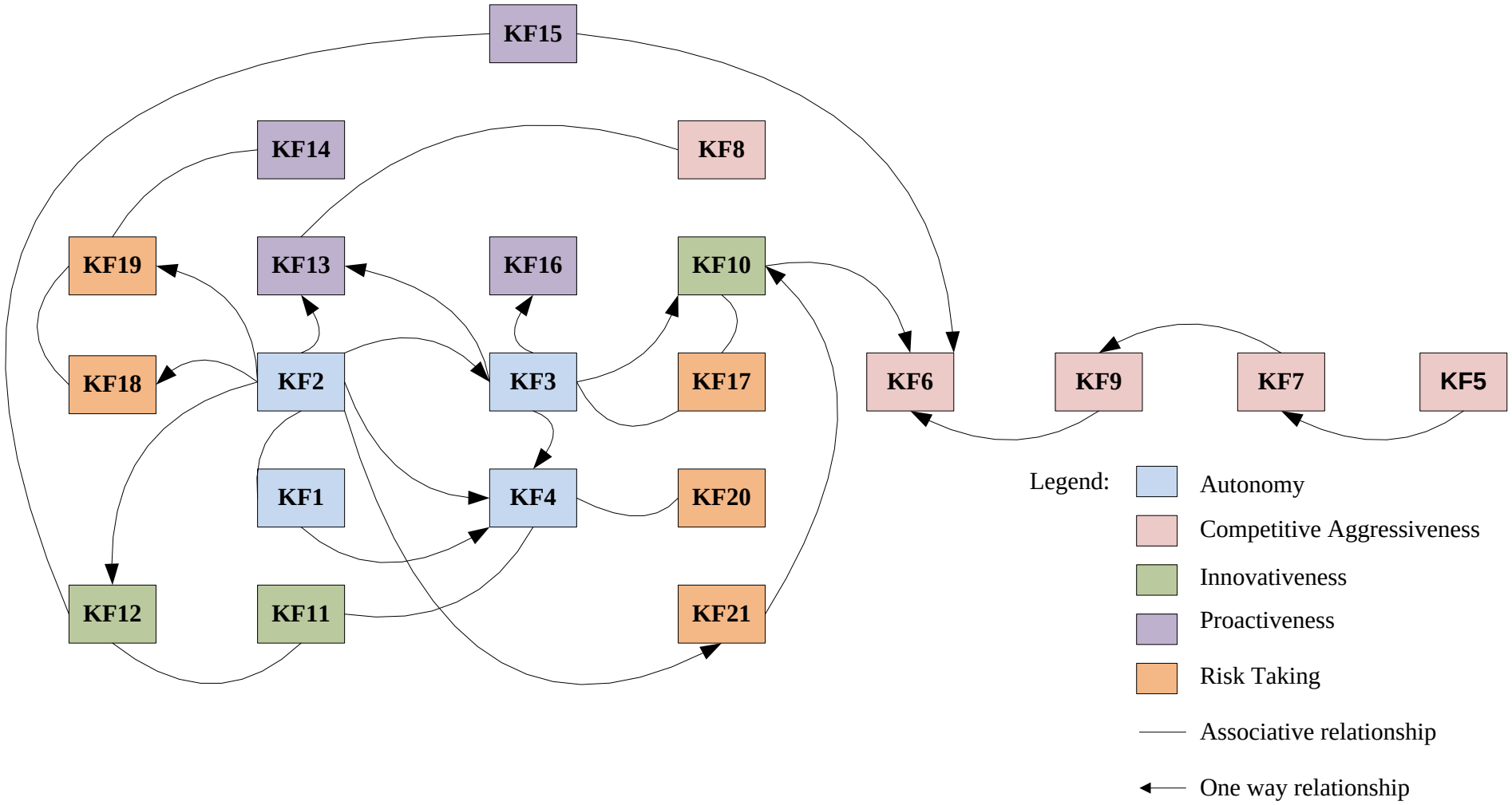


Figure 4-4 Relationship among Indicators

The diagram in Figure 4-4 illustrates the relationships and dependencies among key factors. For example, a series of one-way relationships among key factors 5, 7, 9 and 6: contractor effort to help clients to solve the problem (KF5) will build its image as a trusty and reliable contractor (KF7). This positive image gives a chance to the contractor to position itself in a market that is more concerned about quality than price (KF9); therefore, the contractor will not engage in unfair competition by lowering price to an unreasonable level in order to get a project. In this particular case, the contractor will be considered different compared to the competitors (KF6).

Furthermore, when all relationships between key factors were examined, it was found that autonomy for communication (KF2) is the key factor that most widely supports other key factors. It supports the other 7 key factors and has an associative relationship with another factor as explained below.

Autonomy for communication supports autonomy for proposing suggestions that benefit the projects and company (KF3). Without autonomy for communication, staff cannot share their idea(s) with the higher level managers to improve the performance of the project and company. Autonomy for communication supports autonomy in planning and managing a project (KF4). Even though the project team has autonomy to plan and to manage the project independently, they still need to communicate their plan in detail and with enthusiasm to the head office's team. For example, the determination of methods, materials, equipment, etc. must be adapted to the existing sources in the company. Autonomy for communication supports programmes that spark innovation (KF12) because autonomy for communication provides an opportunity for staff to share their ideas and knowledge, as well as problems, with other staff, and then through this communication, innovation can be generated. Carrying out marketing activities (KF13) is supported by autonomy for communication because this autonomy gives staff a chance to convey information about new projects that are available in the market. Autonomy for communication (KF2) has a positive impact on the contractor's risk taking to select clients (KF18) as well as risk taking on financial aspects of the project (KF19) and risk taking on technical aspects of the project (KF21). When staff have autonomy for communication, they have the chance to provide relevant information with respect to the clients that they know. As a result, the company's top management will feel more confident to take a risk to select the client. Likewise, the staff can convey their opinion about the potential problems that will occur in the project; therefore, the

risk of a project's losses and a project's technical problem can be anticipated before the decision is made.

In addition to support those seven key factors, autonomy for communication (KF2) is also associated with autonomy for accessing information (KF1). In this relationship, they are linked but do not influence one another. Usually during communication, information is also shared; therefore autonomy for communication and autonomy for accessing information can happen together. Another reason for the relationship between these key factors is the facility, such as information system, is available to support both of them.

4.3.2 Relationship between Dimensions of Corporate Entrepreneurship

It has been explained earlier in this chapter that the 21 key factors were classified into five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness and risk taking. When the relationships between the dimensions were investigated, several phenomena have been found. The relationship between dimensions was developed, based on the relationship between key factors under each dimension. It means two dimensions are considered related if the key factors under those dimensions are related to each other. For example, KF 15 under proactiveness and KF10 under innovativeness are related to KF6 under competitive aggressiveness, therefore it can be concluded that proactiveness as well as innovativeness have relationship with competitive aggressiveness. After examining all relationships, it was found one diagram can showing the whole relationship between dimensions, as in Figure 4-5.

When considering the relationship between these five dimensions, it was found that autonomy is the dimension that most widely supports and has strong influence on other dimensions. It supports contractors to be innovative, proactive and risk takers.

Competitive aggressiveness is the dimension with the least relationship to other dimensions. It is not linked to autonomy and risk taking. However, when the overall picture of the relationships is examined, it is found that two dimensions, proactiveness and innovativeness, which are related to competitive aggressiveness, both have relationship with autonomy and risk taking; therefore, competitive aggressiveness has

indirect relationships with autonomy and risk taking. This indirect relationship can be seen from the following example: risk taking for innovation (KF17) as a key factor of risk taking is related to carrying out research and development activities (KF10) as a key factor of innovativeness and, in turn, KF10 is related to being different compared with competitors (KF6) as a key factor of competitive aggressiveness.

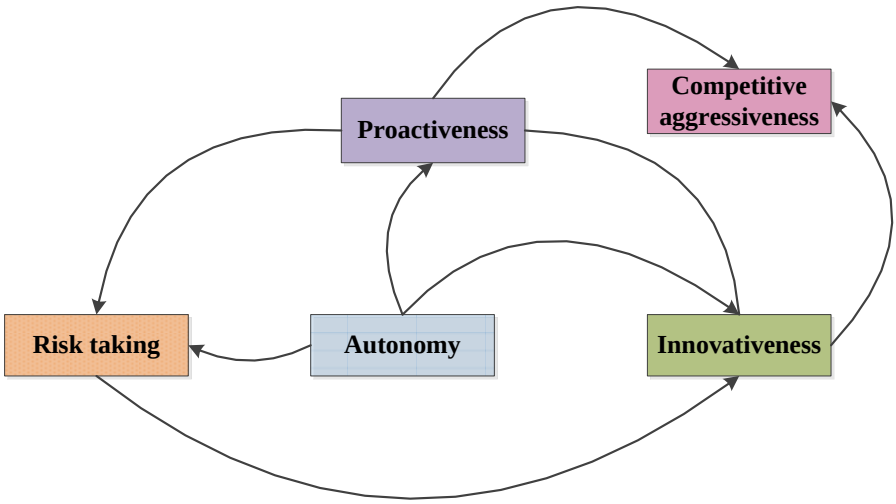


Figure 4-5 The relationship between dimensions

4.4 PARTICULAR ISSUES OF CORPORATE ENTREPRENEURSHIP FOR CONTRACTORS IN INDONESIA

The findings of this study about the key factors of CE for contractors that have been presented in this chapter were found from the experiences of contractors in Indonesia. Therefore these findings are influenced by some particular circumstances of Indonesian contractors in running their business.

The issues that are considered to have been influenced by the circumstances of Indonesian contractors in running their business are explored further in order to provide a background behind the findings of this study. The results are presented as follows.

1. High competition due to huge numbers of contractors is happening in Indonesia's construction industry. In 2008 National Board of Construction Services Development (NBCSD) of Indonesia has registered 112,071 contractors. According to Wirahadikusumah and Pribadi (2011) the majority of these contractors were rated as providing poor to fair performance, only about 100 contractors can be considered as an excellent contractors delivering high

quality of works. In this particular situation, Sudarto et al. (2007) considers sustainable business is not a concern of many contractors in Indonesia and their business orientation is still on short-term profit. This condition triggers 'price war' competition, where contractors lower the bid price to an unreasonable price in order to obtain the project; unrealistic pricing has become an issue in contractor business in Indonesia. This particular business situation encouraged the contractors that participated in this study to raise the issue of positioning on markets that are concerned about quality (KF9).

2. Widjajanto et al. (2011) mentioned that the contractors doing projects overseas are fewer in number than foreign contractors coming to Indonesia, whose numbers have increasing in the last couple of years. Larasati ZR and Tsunemi (2009) considered lack of ability as a problem of local contractors to compete in the global or international market place. In this particular situation, looking ahead to future demands (KF15) with special emphasis on certifications that are recognized globally, such as ISO, green contractors, etc. gets special attention.

3. The main building materials are still dependent on imported products, therefore the unstable exchange rate of Indonesian currency increasing contractors' financial risk. In this particular circumstance, contractors are required to take a bold action to take on projects with financial risk (KF19). However this behaviour must be carried out under controllable circumstances.

4. Lacking legal protection in all aspects is a fundamental issue in Indonesia including problems in construction. In this situation, legal disputes between contractors and clients potentially become a big issue without proper solution. However contractors are still expected to take risks for selecting clients (KF18) but it must be a calculated risk taking, instead of choosing clients inconsequential or without due diligence.

The explanations about the particular circumstances of contractors' business in Indonesia clarify the issues behind the development of key factors of CE in this study. However the findings of this study are considered appropriate to be adopted by contractors in general although they need to be examined further and adjusted accordingly to the circumstances of the local construction industry. For example, if there is big emphasis on the issue of sustainability issue in a particular country, it might be included as part of the CE key factors.

4.5 SUMMARY

This chapter has set out the details of the implementation of CE in contractors and identified its key factors. Twenty one key factors have been identified from the interviews with 19 top managers from 18 contractors in Indonesia. These key factors are categorized into five dimensions of CE: autonomy, competitive aggressiveness, innovativeness, proactiveness, risk taking.

The key factors found in this study are considered as unique and have not been identified before. Most key factors are related to two main challenges of contractors business: 1) to win the competition to get the project and 2) to deliver the project successfully. In addition, business diversification is another key factor for survival in the highly competitive environment of contractors business, instead of just focusing on construction projects as a main business.

These key factors were identified based on the experiences of contractors in Indonesia, therefore they are influenced by the particular circumstances of those contractors. However the findings of this study are considered appropriate to be adopted by contractors in general by implementing minor modifications that reflect the local characteristics of the country in which the contractor is operating.

Further analysis found that almost all of the key factors and the dimensions are related to each other. This finding convinces this research that entrepreneurial contractors cannot apply key factor individually or in isolation; these key factors must be applied in an integrated and complementary way. However, it is reasonable to point out that the relationship between key factors might be different in each country, due to different or unique circumstances in that country.

The key factors that were found in this chapter will be used as indicators in the CECM as discussed in the next chapter.

Chapter 5 - THE CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL FOR CONTRACTORS

5.1 INTRODUCTION

This chapter presents the CECM. This model is developed to assess contractor capability to implement CE. The chapter first presents the background, aim and objectives of CECM then explains the model development approach that was adapted to develop CECM. CECM is developed based on the CMM approach; therefore background, concept and implementation of CMM are explored further. Finally the components of CECM and CECM assessment matrix are explained in detail. The procedure to implement CECM is also presented in order to guide the contractors on how to use this model properly.

5.2 BACKGROUND, AIMS AND OBJECTIVES OF CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL

CE has been justified as a strategy to improve company performance. The implementation of CE to support business in general and contractor business in particular, has been discussed in detail in the earlier chapters. Furthermore it was found that in order to develop a corporate strategy based on CE; contractors need to identify their existing and target entrepreneurial characteristics. Then the discrepancy between them can be identified and the strategy will be directed to fill this discrepancy.

For this purpose, contractors need a comprehensive framework to assess their existing and target entrepreneurial characteristics. So far, models for assessing CE have not been developed in a comprehensive manner. Mostly, the models are directed to measure CE levels in order to find the correlation between a company's CE level and its performance. In this situation, a comprehensive model to assess CE, that can guide contractors to develop appropriate strategy, is needed.

The maturity model has been considered as a model that enables companies to assess their performance objectively. This model has been adopted in many fields including construction. When several maturity models were reviewed, it was found that most of them are directed to two main aims. The first aim is to guide companies to assess their existing level of capability or maturity and second is to identify a realistic target level. Then based on the assessment results an appropriate strategy can be designed to fill the gap between the existing and target levels (Hutchinson and Finnemore, 1999, Sarshar et al., 2000, Nightingale and Mize, 2002, Zou et al., 2010). Moreover, using the maturity model, a company can be benchmark its position in relation to its competitors (Hillson, 1997, Hutchinson and Finnemore, 1999, Sarshar et al., 2000, Kwak and Ibbs, 2002).

The aims of maturity models are in accordance with what is expected from CECM. Contractors and other related parties expect the CECM to provide clear guidance to assess contractors' capabilities to approach to CE. Based on this aim, CECM is directed to meet the following objectives.

1. To assess the existing level of capability and to identify the realistic target capability level of contractors in approaching CE.

2. To determine and to position the contractors' CE capability level against other contractors.

The result of CECM can be used by top management of contractors to design an appropriate strategy to move from their existing capability level to the target capability level. However, to develop an appropriate strategy, a contractor also needs to know its position compared to the competitors. Although it is not possible to determine the ability of competitors in detail, but at least by knowing their own capabilities and the indicators used as the criteria, the contractor can compare its own capability with the achievements and behaviours of its competitors.

CECM provides another potential benefit, especially for external parties, such as: association of contractors, government agencies and potential clients. The external parties use CECM to evaluate the performance of contractors. Such evaluation is usually required by clients when they have to choose a contractor or by an association and government agencies to classify of contractors. Figure 5-1 is presented to provide clear picture of the aim and objectives of CECM.

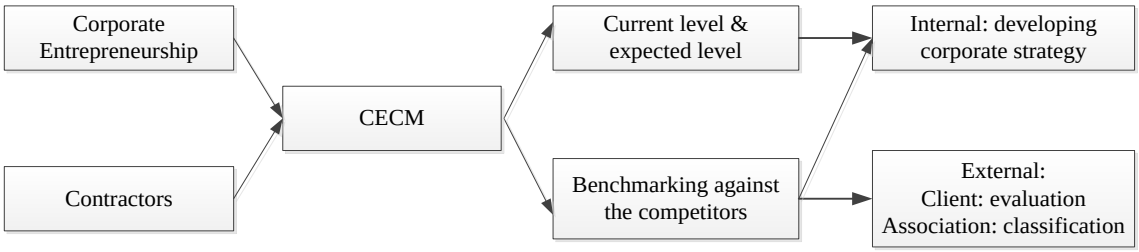


Figure 5-1 CECM aim and objectives

5.3 MODEL DEVELOPMENT APPROACH

CECM is developed using the CMM, which provides an assessment framework that has been widely accepted by several business sectors because it has been developed comprehensively, explained clearly and improved from time to time. This section explains CMM further, from its background and history up to its main components such as maturity levels and key practice areas, based on the technical report of Capability Maturity Model^{SM} for Software, Version 1.1 (Paulk et al., 1993).

5.3.1 Background of Capability Maturity Model

Currently there are many standards, models, methodologies, and guidelines in the marketplace to help companies to measure their performance and to improve the way to do business. Among these models, the CMM is one that is widely accepted by several business sectors. This model provides a comprehensive framework to assess company performance and it has been developed and improved over time.

CMM was initially developed in 1991 by the Software Engineering Institute, Carnegie Mellon University. The development of this model was begun from the situation, in which over more than two decades, industry and government organization were searching for a solution to the fundamental problem of identifying software companies to manage their software processing properly.

Associated with the ability to manage software processing, software companies can be categorized into immature or mature entities. Usually immature companies gain successes in software projects, not through their ability to manage the processes but

through the efforts of their dedicated teams. These software companies do not prepare the basis for long term improvement; therefore productivity and quality do not continuously improve. On the other hand, the mature software companies have an ability to manage and maintain the software development process. In mature companies, the software process is communicated accurately to all staffs, carried out accordingly to the plan, as well as evaluated and improved continuously.

In order to determine the maturity of a software company to manage the software process, an assessment model is needed. Therefore CMM was developed to help industry and government organizations to assess the ability of software contractors. In addition, this model also helps software companies themselves to improve their ability to manage software processes and processing.

CMM is the model that can be used as a basis to improve the software process systematically. It does not describe the process itself but it provides a framework to assess the current condition of a software process and to identify the critical issues that are important for software process improvement. Based on CMM, a set of tools can be developed to guide software companies to improve their software process.

CMM has been well developed and evolved over time. Initially CMM version 1.0 was developed in 1991; two years later CMM version 1.1 was released as a result of feedback from software professionals in a workshop. Then four years later CMM Version 1.2 draft C was released. Combining this version with two other source models: the System Engineering Capability Model (SECM) EIA 2002a and the Integrated Product Development Capability Maturity Model (IPD-CMM) version 0.98, the Capability Maturity Model Integration (CMMI) was developed. This model was developed to satisfy the need for a model that focuses on improving performance across disciplines within the organization when the application of single model becomes less than optimal. Therefore the CMMI can sort out the problem of using multiple CMMs.

5.3.2 Existing Capability Maturity Models

The CMM has been accepted as a useful model to many organizations and has been adopted widely in many disciplines. Consequently this model has been evolved and changed to adjust to the field adopting it. This model has changed in many aspects

such as name and number of maturity levels, the process goals, and the process employed to progress from one level to the next. Several maturity models are reviewed in the following section to provide an idea about the existing maturity models that have been developed so far.

The CMM was adopted in the risk management field, in which Hillson (1997) developed a Risk Maturity Model (RMM) to provide a framework for an organization to assess its maturity in applying risk management. Using this model, the organization benchmarks the application of risk management against the standard of four maturity levels. From the bottom to the top, those levels are: naïve, novice, normalized and natural. The benchmarking was based on four attributes: organizational culture, process of risk management, experience of risk management and application of risk management. RMM also provides the actions to be taken in order to develop from one level of maturity to the next level. First the model identified the barriers faced by the company in one particular level in order to develop to the next level. Then based on these barriers, the actions were defined.

Boughzala and de Vreede (2012) proposed their Collaboration Maturity Model (Col-CMM) to conduct practitioners to self-assess the quality of an organization's team collaboration. Later Boughzala (2014) also developed maturity model for knowledge management, which named the Community Maturity Model (CoMM). The latter is used to assess the knowledge management maturity of a community to support the decision making process for building new strategies.

Both models classified maturity of the organization into 4 levels; from the lowest to the highest those maturity levels are: ad-hoc, exploring, managing and optimizing. Col-CMM defined 24 criteria to assess the maturity of organization, these criteria were derived from four area of concern: collaboration characteristics, collaboration management, collaboration process, and information and knowledge integration. CoMM used 18 criteria that were defined from 4 areas of concern: joint enterprise, mutual commitment, shared capital and collaborative work. In order to assess the maturity level of a company, each criterion is evaluated on a scale of four maturity levels. The final output of the model was an action plan to improve performance and quality of collaboration in Col-CMM, as well as the implementation of knowledge management in CoMM.

Lockamy III and McCormack (2004) developed a Supply Chain Management (SCM) Maturity Model, in order to identify the relationship between supply chain management maturity and performance. The model was conceptualized based on supply chain operations reference (SCOR) and assigned five maturity levels. The five maturity levels were graded from lowest to highest levels as follows: ad-hoc, defined, linked, integrated and extended. In these various levels, started from defined level the processes are basically defined, then measured, controlled and finally optimized.

Their study was replicated by Söderberg and Bengtsson (2010). They examined the relationship between supply chain management process maturity with supply chain performance and financial performance in the case of small and medium sized companies.

Another maturity model was addressed to 'lean' issue. The Lean Enterprise Self-Assessment Tool (LESAT) was developed to assess the maturity level of a company to deal with lean principles and practices in order to achieve value creation for the stakeholders and end customers. The assessment purpose covers a company's level of 'leanness' and how that company is ready to change to deal with the lean issue. This model employed five levels of maturity and three sections of the Lean Enterprise Process Architecture. The maturity levels were evolved from level 1 for 'least capable' to level 5 for 'most capable' or 'world-class performance'. The three assessment sections cover lean transformation, life cycle processes and enabling infrastructure that were derived into 54 lean practices. The result of current and desired maturity levels assessment, using this model, will enable the company to identify important opportunities to improve the process of lean operating (Nightingale and Mize, 2002).

In order to provide a clear picture of the existing maturity models that have been developed in various fields, Table 5-1 is prepared. This table summarizes the existing maturity models in some aspects such as focus, maturity level, assessment criteria, and output.

Table 5-1 Existing capability maturity models

Model	Focus	Maturity Levels	Key Process Area	Output
RMM (Risk Maturity Model)	Organization risk management	Four levels: 1) naïve, 2) novice, 3) normalized, 4) natural	Four attributes: 1) culture, 2) process, 3) experience, 4) application	Action to progress from one level to the next level
(Col-CMM) Collaboration Maturity Model	Organization team collaboration	Four levels: 1) ad-hoc, 2) exploring, 3) managing, 4) optimizing	Four area of concern: 1) collaboration characteristics, 2) collaboration management, 3) collaboration process, 4) information and knowledge integration	Action plan to improve performance
COMM (Community Maturity Model)	Knowledge management	Four levels: 1) ad-hoc, 2) exploring, 3) managing, 4) optimizing	Four area of concern: 1) joint enterprise, 2) mutual commitment, 3) shared capital and 4) collaborative work	Action plan to improve performance
SCM (Supply Chain Management)	The relationship between maturity and performance of SCM	Five levels: 1) ad-hoc, 2) defined, 3) linked, 4) integrated and 5) extended	Supply chain operations reference (SCOR)	Very strong relationship between maturity and performance of SCM
SCM (Supply Chain Management)	The relationship between maturity of SCM and financial performance	Five levels: 1) ad-hoc, 2) defined, 3) linked, 4) integrated and 5) extended	SCOR	Very strong relationship between SCM maturity and financial performance
LESAT (Lean Enterprise Self-Assessment Tool	Lean principles and practices	Five levels from 1 for least capable to 5 for most capable	Three sections: 1) lean transformation, 2) life cycle processes, 3) enabling infrastructure	Opportunities to improve the lean process

Another study associated with the maturity model focused on benchmarking several models in the same field such as Business Process Management (BPM) (Roglinger et al., 2012) and Product Lifecycle Management (PLM) (Vezzetti et al., 2014). These studies were carried out to respond to the situation in which large numbers of maturity models in the same areas have been published, making it difficult for business practitioners to determine the most suitable models to be applied in their business.

Roglinger et al. (2012) reviewed and compared ten BPM maturity models: Business Process Management Maturity Model (BPMMM), Process Performance Index (PPI), Business Process Reengineering Maturity Model (BPRMM), Business Process Maturity Model (BPMM), Process Management Maturity Assessment (PMMA), Business Process Orientation Maturity Model (BPOMM), Process and Enterprise Maturity Model (PEMM), Process Maturity Ladder (PML), Business Process Maturity Model (BPMM). Similarly Vezzetti et al. (2014) benchmarked six PLM maturity models in the PLM domain: 1) Batenburg proposal, 2) Saaksvouri and Immonen proposal, 3) Stark proposal, 4) Schuh proposal, 5) Karkkainen proposal, and 6) Terzi proposal based on five aggregated categories: detail level, testing, effectiveness, application and addressed domain.

Finally, after reviewing all the models proposed in same area, it is reasonable to conclude the studies provide guidance for companies to choose the most appropriate maturity models to implement in their businesses. CMM has also been adopted to assess several aspects related to construction. Maturity models related to construction are reviewed in details in the following section.

5.3.3 Existing Capability Maturity Models in Construction

CMM is growing rapidly and spreading widely in the construction field. A number of maturity models have been developed to assess the maturity levels of several aspects in construction. After reviewing several models, this study found a maturity model that was developed for assessing maturity in construction in general context. This model is named the Standardized Process Improvement for Construction Enterprises (SPICE). The other maturity models were developed to measure maturity levels of a particular aspect of a construction company. A maturity model to assess construction

industry maturity was also found when reviewing the literature. This section reviews all of these maturity models with special emphasis on SPICE as a main and basic maturity model in construction.

5.3.3.1 Standardized Process Improvement for Construction Enterprises (SPICE)

In the last few decades, the global construction industry has been challenged to improve its performance. However, the construction industry had not found an effective framework that could be used as a basis to resolve this challenge. The industry could not assess its performance properly and systematically in order to identify their businesses' advantages and disadvantages. Moreover the construction companies could not benchmark their performance compared to their competitors (Hutchinson and Finnemore, 1999, Sarshar et al., 2000, Jeong et al., 2004).

In order to respond this challenge the Standardized Process Improvement for Construction Enterprises (SPICE) was developed. This model adopted the CMM approach as the most widely adopted maturity model. SPICE was developed as a generic maturity model that can be applied to assess the maturity of a single phase of a project, multi phases across the life cycle of a project, or even the whole company. It can be applied for a single company or even the complete supply chain (Sarshar et al., 2000).

Since SPICE began to be developed in 1998, it has been under continuous research and development. The early research was focused on the process improvement of individual project; then it was followed by research that was focused on process improvement across the construction company itself (Sarshar et al., 2000). Later SPICE was adopted to initiate improvement of the facility management (FM) process which produced SPICE FM (Amaratunga et al., 2002).

Following the CMM approach that process improvement must follow in evolutionary rather than revolutionary steps, SPICE organizes process improvement into five maturity levels starting from 'initial' or 'chaotic' and then followed by 'repeatable' or 'planned and tracked', 'well defined' or 'good practice sharing', 'managed' or 'quantitatively controlled', and finally the top level is 'optimising' or 'continuously improving'. There is a set of key processes area in every level except level 1 because this level is the entry level where not all processes have been implemented properly or perhaps do not exist yet. In order to achieve a particular level,

the key processes in that level must be performed completely and well (Sarshar et al., 2000).

The first iteration of SPICE was focused on key processes area for level 2. Key processes are for level 2 are categorized under eight headings: 1) brief and scope of work management, 2) project planning, 3) project tracking and monitoring, 4) subcontract management, 5) project change management, 6) health and safety management, 7) risk management, and 8) project team coordination (Sarshar et al., 2000). In the second iteration, key processes area for level 3 were categorized under four headings: 1) process definition, 2) process customisation, 3) process training, and 4) process improvement resourcing (Jeong et al., 2004).

5.3.3.2 Other maturity models in construction

In addition to SPICE that provides a generic framework for assessing maturity levels for both at project and company, several maturity models have been developed in various particular fields in construction such as information technology (Stewart, 2000), project management (Kwak and Ibbs, 2002), change management (Sun and Oza, 2008), risk management (Zou et al., 2010), supply chain (Meng et al., 2011). All of these models were focused on company maturity level. In addition, one maturity model was developed to assess maturity of the construction industry itself (Willis and Rankin, 2012).

All of these maturity models were found to be directed to measure the maturity level of a company in each particular issue focused on. The result of this assessment can be used by the companies to benchmark themselves against other companies. The result also shows the company's weaknesses and strengths; very useful information when it comes to designing the strategy to improve performance. However, instead of the similarity in aims and objectives of these models, they are also different in some aspects such as: focus area, assessment criteria and maturity level, because they are customized to meet specific needs and are therefore adjusted to the issues that are different in every single area of the construction industry. The following section will explain the differences of each model.

Stewart (2000) developed a Strategic IT Maturity Model (SIMM) to provide a tool for construction companies to describe and measure the maturity of business strategy development and the use of its IT portfolio. The model identified 18

characteristics that are categorized under four elements of business: business strategy (BS), business infrastructure (BI), IT strategy (ITS) and IT portfolio (ITP) and six alignments between these elements such as BS-BI, BS-ITS. In order to assess company maturity, these 18 characteristics are categorized under four maturity levels that are arranged sequentially from bottom to top as follows: ad hoc, support, dependent and enabled. In order to achieve a particular maturity level, the characteristics that are categorized under that level must exist in the company.

Kwak and Ibbs (2002) developed a model to assess the maturity level of a construction company in dealing with project management (PM). The Project Management Process Maturity $(PM)^2$ model was developed to determine a construction company's project management maturity level and to benchmark it against other companies. Based on this model, companies can identify their strengths and weaknesses in their project management practices and determine the strategy to improve their performance in order to achieve higher maturity level.

$(PM)^2$ adopted nine PM knowledge areas and five PM processes of Project Management International's (PMI's) PM body of knowledge as the key aspects of the model. The nine PM knowledge areas are: project integration management, project scope management, project time management, project cost management, project quality management, project communication management, project human resources management, project risk management and project procurement management. The five PM processes are: initiating, planning, executing, controlling and closing. These key aspects are assessed against five maturity levels that from the lowest to the highest levels are: ad hoc, planned, managed at project level, managed at corporate level, and continuous learning.

A maturity model for assessing contract changes was developed by Sun and Oza (2008). The model was named the Change Management Maturity Model (CM3) and it is aimed to provide a framework to measure the capability of project team to deal with contract changes during the construction process. The CM3 framework measures a capability level based on six key process areas: management process, risk management, communication, information management, collaboration and leadership. All of these key process areas are assessed against five levels of maturity; starting from ad hoc, informal, systematic, integrated, up to continuous improvement.

Zou et al. (2010) developed a maturity model for risk management in construction organizations. They named the model as Risk Management Maturity Model (RM3). Using this model, construction companies can assess their risk management maturity level and develop a proper strategy to improve their risk management practice. Risk management practice in RM3 is represented by five attributes of risk management: management, culture, risk identification, risk analysis and systematic risk management, Based on these attributes, the risk management practice of the company is assessed against four maturity levels starting from ad hoc, repeatable, managed and finally optimized.

Another model was developed to assess maturity levels of supply chain practice of a construction company (Meng et al., 2011). The model provides a framework for construction companies to assess and to improve management of the supply chain between key partners in the construction process. The framework of this model consists of 24 assessment criteria which are categorized into 8 categories: procurement in supply chain relationships, objectives of collaboration, trust between the parties, collaboration between the parties, communication between the parties, problem solving, risk allocation, and continuous improvement. Each criterion is assessed against 4 levels of maturity. Maturity levels from the lowest to the highest level used in this model are: 'price competition', 'quality competition', 'project partnering', and 'strategic partnering'.

In addition to these maturity models that were developed to assess maturity level at the organization level, this study found one maturity model for a different level which is at industry level. Willis and Rankin (2012) developed the Construction Industry Macro Maturity Model (CIM3) to assess maturity level of a nation's or a sector's construction industry performance. This model was developed in order to fill the gap left by missing maturity models able to deal with the whole construction industry at the macro level, because they found previous maturity models were developed in construction to be applied at the company level.

CIM3 considers the construction industry to be comprised of six key practice areas (KPAs): cost, quality, procurement, health and safety, environment and planning. Then each KPA contains a set of key practices; for example cost management KPA contain 9 key practices, quality management KPA contain 8 key processes, etc. In order to find the maturity level of a particular construction industry, each key process is

assessed against three maturity levels from 1 for ‘inconsistent’, 2 for ‘standard’ up to 3 for ‘effective’.

All of these maturity models have been reviewed with an emphasis on the area in which the models were developed, the criteria used to assess the maturity level and the levels of maturity used in the models.

Table 5-2 shows the comparison of existing maturity models in construction. Furthermore Figure 5-2 presents the scheme of existing maturity models in construction.

5.3.4 Capability Maturity Model Framework

5.3.4.1 Maturity levels

The CMM is a model that was developed based on the concept of continuous process improvement. Normally the process is continuously improved based on small evolutionary steps rather than revolutionary improvement. Based on this idea, CMM provides a framework that guides the software company to evolve step by step from one level to the next level. The framework of CMM consists of five maturity levels that are laid successively for continuous process improvement. Maturity level is defined as the stages of evolutionary process improvement, in which one stage is a basis to evolve to the next stage.

The five maturity levels of CMM, as shown in Figure 5-3 are arranged sequentially from initial, followed by repeatable, defined, managed, up to optimizing. Each level is indicated by different characteristics as described below.

1. Initial

   This level is considered as ad hoc and even chaotic; in this level only a few processes are defined so that the success of the process depends on the competence and efforts of individuals. Organizations in this level usually do not have stable environments in which to develop and maintain the process, therefore the process is unpredictable, unstable and it can be changed or modified during its progress.

Table 5-2 Existing maturity models in construction

Model	Goal	Capability Maturity Level	Process Area
Construction company and project level			
SPICE (Standardized Process Improvement for Construction Enterprises)	To provide a systematic approach for construction companies to improve their management processes	Five levels: 1) initial; 2) repeatable; 3) planned; 4) well defined; 5) managed	Level 1: no key process areas (KPA) Level 2: eight categories of KPA Level 3: seven categories of KPA
Construction company level			
Supply Chain Relationship Maturity Model	To provide a model to assess and to improve management of the supply chain between key partners in construction process	Four levels: 1) traditional; 2) transition; 3) short-term collaborative; 4) long-term collaborative	Eight main criteria with 24 sub-criteria
RM3 (Risk Management Maturity Model)	To guide companies to understand and to improve their risk management practice	Four levels: 1) initial and/or ad hoc; 2) repeatable; 3) managed; 4) optimized	Five attributes

CM3 (Change Management Maturity Model)	To provide a framework to measure the capability of a project team to deal with contract changes during the construction process	Five levels: 1) ad-hoc; 2) informal; 3) systematic; 4) integrated; 5) continuous improvement	Six key process areas
$(PM)^2$ (Project Management Process Maturity Model)	To determine company's project management level and to benchmark it relative to other companies and then based on this result the guidance to improve project management maturity will be provided	Five levels: 1) ad-hoc; 2) planned; 3) managed at project level; 4) managed at corporate level; 5) continuous learning	Nine project management knowledge areas integrating with five project processes
SIMM (Strategic Information Technology Maturity Model)	To help construction company to describe and measure strategic IT alignment	Four levels: 1) ad-hoc; 2) support; 3) dependent; 4) enables	Four component
Construction industry macro level			
CIM3 (Construction Industry Macro Maturity Model)	To assess the performance of a nation's construction industry's	Three levels: 1) immature; 2) transitional mature; 3) mature	Six key practice areas

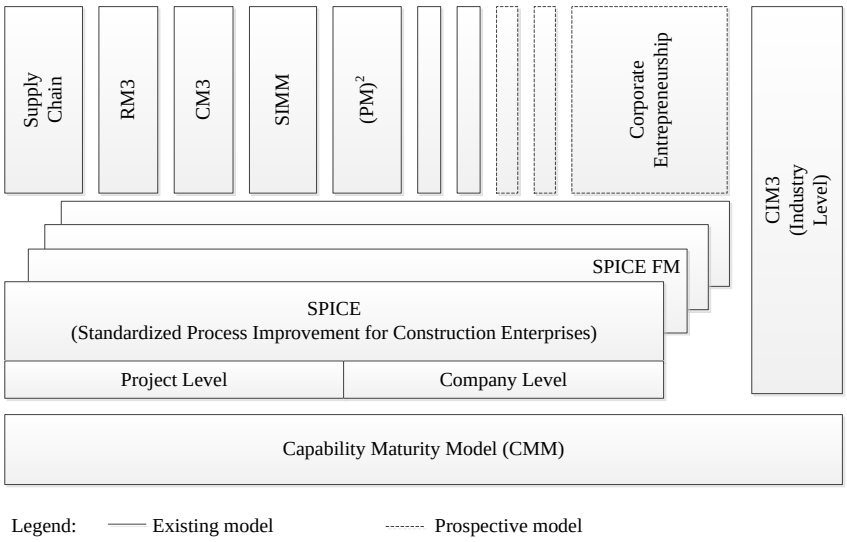


Figure 5-2 Scheme of existing maturity models in construction

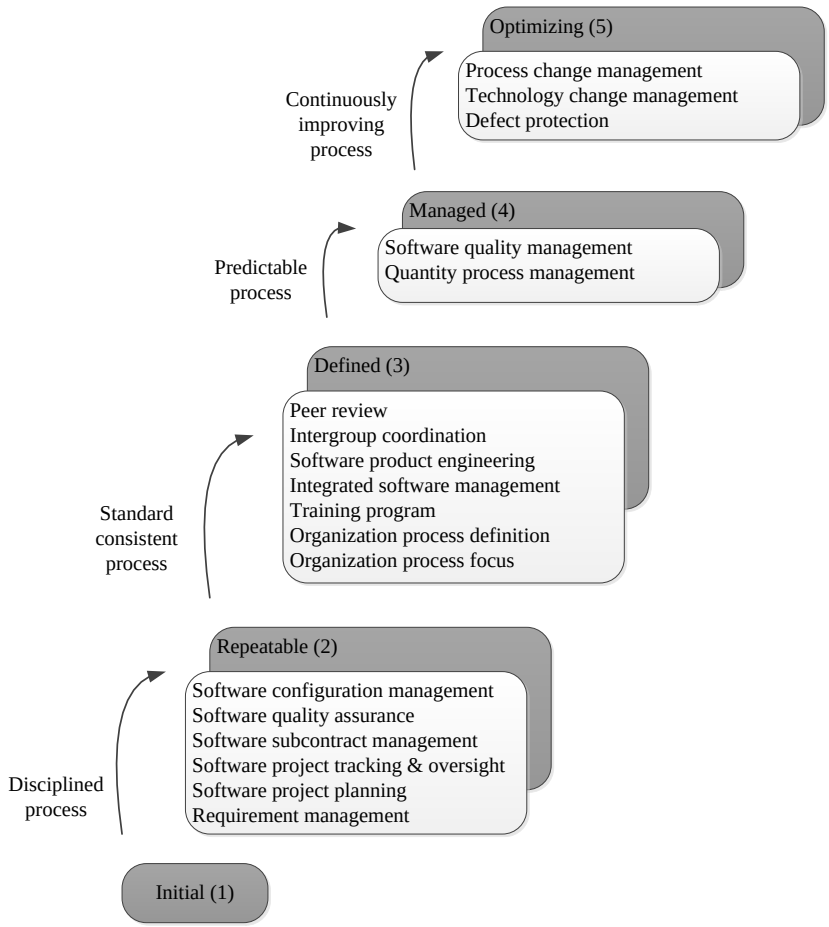


Figure 5-3 The key process areas by maturity level (Paulk et al 1993)

2. Repeatable

   Policies to manage the process and procedure to implement those policies have been established in the organizations at this level. Therefore the new project can be planned and managed based on the experience with similar project because the earlier successes are allowed to be repeated.

3. Defined

   At this level, the established process is documented, standardized and integrated into an organization's standard process, therefore the process is implemented consistently and under control; the quality of products are tracked. In this situation, projects adjust the organization's standards to determine the process to be undertaken in accordance with its uniqueness.

4. Managed

   At this level, the process and quality of product are predictable because they are quantitatively measured, understood and controlled; therefore when irregularity of the process and deviations of the products are found, the corrective actions can be taken to restore them to their correct path.

5. Optimizing

   Organizations at this level are continuously improving the process based on the feedback from the process. These organizations have a tool to identify their weaknesses and strengths; therefore the process can be proactively improved and the process failure can be prevented.

5.3.4.2 Key process areas

Key process areas are the areas upon which the organization needs to focus to improve its process. These key process areas are considered the important process areas because of their effectiveness when it comes to improving the process. They can even be considered as compulsory requirements to achieve a certain maturity level.

Each maturity level, except for level 1, consists of a set of key process areas. In order to reach a certain level, the key process areas in that level must be performed adequately. Considering this requirement, therefore there are no key process areas for level 1 because the processes at level 1 are not stable and are unlikely to be

implemented adequately. The key process areas that are distributed into five maturity levels of the CMM that are arranged sequentially from bottom to top as can be seen in Figure 5-3. The arrows that connect one level to the next level indicate the type of process that exists at every stage of the framework.

5.3.4.3 Representation

According to CMMI Product Team (2010), the CMMI, as a new version of CMM, introduced two different improvement paths to approach levels that are known as representation. There are two different representations proposed by CMMI: 'staged representation' and 'continuous representation'.

Staged representation is focused on the maturity level of an organization's overall performance, while continuous representation is focused on the capability level of each process area. Both representations use the same process areas but they were applied by a different evolutionary path. Staged representation uses maturity level as its evolutionary path. Each maturity level covers a set of process areas that need to be implemented adequately to reach that level. Continuous representation uses capability level as its evolutionary path and assesses the same process areas against capability levels. Therefore using continuous representation allows organizations to determine problematic process areas or established process areas; therefore the organizations can focus on the process areas that are suitable to their interests.

Regarding to these two alternative representations, the organization is required to select one of them. The selection can be based on some reasons such as the most familiar with, the best meets the company's objectives or the best meets the company's business environment.

Table 5-3 presents the similarities and differences between these two representations in order to give a clearer comparison between them. In addition to this table, Figure 5-4 provides a clearer picture about the implementation of both representations. This figure shows the assessment of process areas in both representations. Continuous representation assesses the capability of each process area against four levels of capability; for example: process area 1 is at capability level 3; process area 2 is at capability level 4, and so forth. Staged representation assesses the maturity of an organization by grouping process areas into each maturity level. To reach the aimed-for maturity level, all process areas in that level must be implemented

adequately. For example process areas 1, 2, 3 and 4 should be implemented adequately to achieve maturity level 1, process areas 5, 6 and 7 should be implemented to achieve maturity level 2, and so forth.

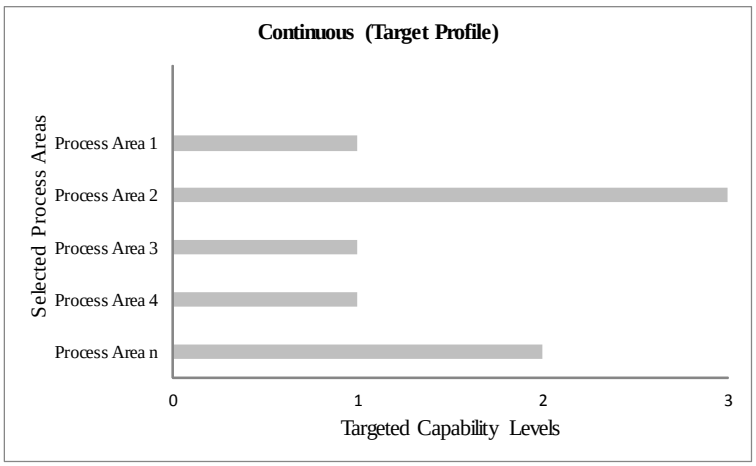
Table 5-3 Comparison of stage and continuous representations

	Stage Representation	**Continuous representation**
Process areas	Same	Same
Evolutionary path	Maturity level	Capability level
Focus	Maturity level of overall organization	Capability level of each process area
Approach	Each maturity level covers a set of process areas that need to be implemented adequately to reach that level	Assessing each process area against capability levels

5.4 CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL: FEATURES OF THE MODEL

This study develops the CECM based on the concept of CMM and continuous representation. Continuous representation is chosen because it is suited to the condition of contractors in implementing CE. Continuous representation assesses all process areas against capability levels; this approach is in accordance with the condition of contractors, who implement all key process areas of CE but at the different level.

By adopting continuous representation, CECM uses capability levels in assessing the capability of a contractor to implement each key process areas of CE. A key process area in this study is considered as an indicator.



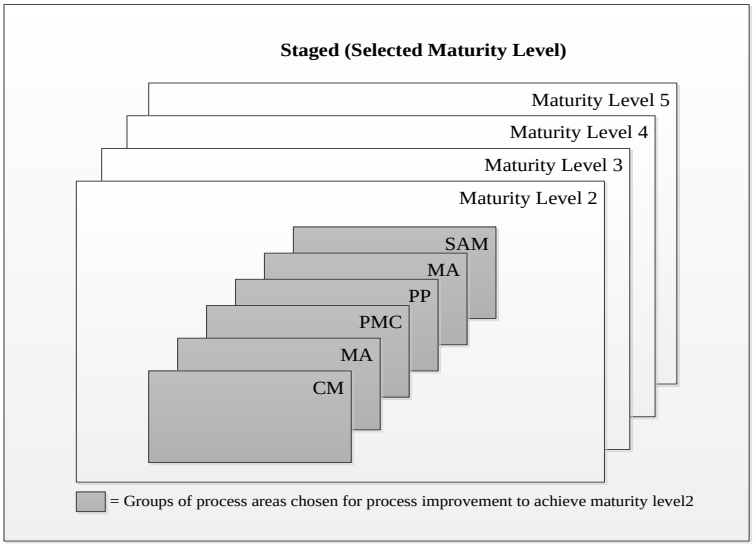


Figure 5-4 Process areas in continuous and staged representations (CMMI Product Team 2010)

5.4.1 CECM Indicators and Capability Levels

CECM consists of two main basic components to develop the model. These two basic components are 'indicators of CE' and 'capability levels'. Based on the concept of continuous representation that has been adopted for this model, the framework will assess the capability levels of contractors to implement each indicator of CE.

This study adopts twenty one key factors of CE, which have been found in this study and have been discussed in detail in the previous chapter, as the indicators of CECM. These key factors are considered as the most important aspects of CE for contractors; therefore the capability of contractors to implement CE can be measured using these key factors as the indicators.

After reviewing several of the existing capability maturity models, as well as considering characteristic of contractors and examining the CE concept, four capability levels are used in CECM; arranged in sequence from the lowest level to the top level as follows: 1) initial, 2) repeatable, 3) managed and 4) optimized. These capability levels are suitable for CECM because the implementation of every indicator in CECM can be range from 'not performed' at the lowest level up to 'defined properly in contractors standard and continuously improved at the highest level'.

Compared to five levels of software process maturity in CMM: initial, repeatable, defined, managed and optimized (Paulk et al., 1993), this study employed only four. The levels 'defined' and 'managed' were combined into one level named 'managed'. Therefore, the 'managed' level in this study meets the criteria of the 'defined' and 'managed' levels offered in the initial model.

The four levels used in this study are similar to the levels used by Zou et al. (2010) in developing their Risk Management Maturity Model (RM3) to assess levels of risk management capability of a construction organization, but in the different meaning. Zou et al. (2010) use even number of levels because they considered odd number of options will encourage respondent to choose the middle value and that will create a biased result.

The capability levels for CECM are defined as follows.

- Level 1: INITIAL

The company is unaware of the need of a particular indicator of CE to help to support the success of the business. No policies and no consistent actions support the implementation of the indicator. The implementation of the indicator depends on self-interest and the individual efforts of the people in the company. No formal processes, no structured approaches and no systematic controls are in place

- Level 2: REPEATABLE

The company is aware of the need for a particular indicator of CE to support the success of the business. The process for implementing the indicator has been established and it is repeated to achieve earlier success for similar applications. Yet there is a lack of standardized process to implement the indicator.

- Level 3: MANAGED

The company is aware of the need of a particular indicator of CE to support the success of the business. The process for implementing the indicator has been defined, implemented, and controlled consistently. The benefits of the process are fully understood. Top management of the company fully supports the implementation of the indicator and the employees are empowered to implement it.

- Level 4: OPTIMIZED

The company is aware of the need of a particular indicator of CE to support the success of the business. The indicator has been fully implemented, standardized and continuously evaluated. Top management of the company fully supports the implementation of the indicator and the employees are empowered to implement the indicator. Feedback from the implementation of the indicator enables continuous improvement of it implementation. The benefits from the implementation of the indicator have been gained.

To provide a better understanding about indicators and capability levels for each indicator, based on continuous representation, Figure 5-5 was prepared.

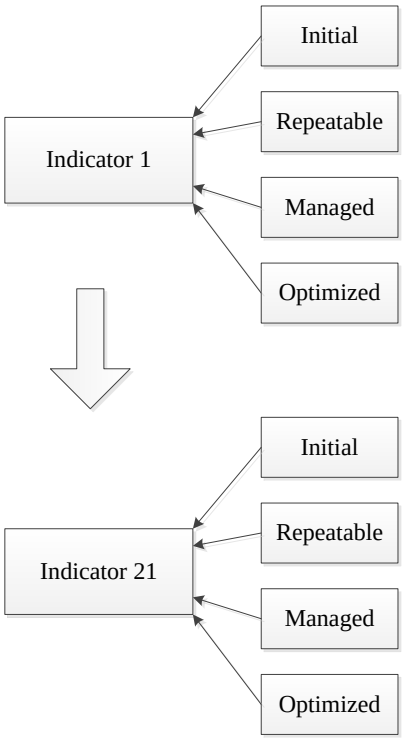


Figure 5-5 Indicators and capability levels of CECM

5.4.2 CECM Matrix

The CECM framework is presented in a matrix format. The framework matrix is described in a simple and brief way in order to provide a clear picture about the whole CECM.

The matrix was developed based on the template as can be seen in Table 5-4. In this table, four capability levels are positioned as a heading of each column and 21 indicators (IN1 to IN21) are positioned as a heading of each row of the matrix. Then each cell, which is an intersection between the column and row, provides the descriptions of each assessment criterion (AC). The AC is the requirement that should be met by contractors to achieve a certain level in a particular indicator. For example: AC 2-3 is the assessment criteria for indicator 2 at level 3 which is meant to achieve level 3 in indicator 2 contractors must meet the requirement as explained in AC 2-3.

Table 5-4 Template of assessment matrix

Indicators	**Capability Level**			
	Level 1	Level 2	Level 3	Level 4
Indicator 1	AC 1-1	AC 1-2	AC 1-3	AC 1-4
Indicator 2	AC 2-1	AC 2-2	AC 2-3	AC 2-4
…	…	…	…	…
Indicator 21	AC 21-1	AC 21-2	AC 21-3	AC 21-4

The full version of CECM matrix that includes 84 AC for 21 indicators of CE against 4 capability levels can be seen in Table 5-5. The model provided in this chapter has been corrected and improved; based on the inputs from the experts and case studies that will be described further in the following two chapters.

Table 5-5 CECM for contractors

CODE	INDICATORS	CAPABILITY LEVEL			
		Level 1 (Initial)	**Level 2 (Repeatable)**	**Level 3 (Managed)**	**Level 4 (Optimized)**
AUTONOMY					
IN1	Autonomy for accessing information	No policy that supports the autonomy of staff to access information, data and knowledge	Information, data and knowledge are accessible but the process has not been managed properly	The company standardizes the autonomy of staff to access information, data and knowledge, the process has been fully implemented	Staff members' autonomy to access information, data and knowledge is standardized, periodically evaluated and continuously improved
IN2	Autonomy for communication	Autonomy for communication within the company is restricted	Communication within the company has been established but the process has not been managed properly	Communication within the company has been going well and the process has been standardized	Communication process within the company has been going well, standardized, periodically evaluated and continuously improved
IN3	Autonomy for proposing suggestions that benefit the projects and companies	Only limited chance for staff to propose suggestions	Staff have a chance to propose suggestions but the process has not been managed properly	The company has a standard provision that supports staff to propose suggestions, and their suggestions has been accommodated properly	Procedure for staff to propose suggestions has been standardized, regularly evaluated and continuously improved
IN4	Autonomy in planning and managing projects	Planning and managing a project is not the autonomy of a project team	Project team has an authorization to plan and manage project independently but the process has not been standardized	Autonomy of project team to plan and manage project has been standardized and top management commits to implement it	Autonomy of project team in planning and managing project has been standardized, regularly evaluated and continuously improved

COMPETITIVE AGGRESSIVENESS					
IN5	Acting as problem solver for clients	The company doesn't care about clients' problems	The company commits to help clients to resolve their problems but the process has not been standardized	The process for helping clients to resolve their problem has been standardized and implemented well	The process for helping clients to resolve their problem has been standardized, regularly evaluated and continuously improved
IN6	Being different compared to competitors	No effort for being different comparing to competitors	Actions to become different compared to the competitors has been carried out but has not been standardized	Policy to become different compared to the competitors has been standardized and the implemented well	Process to become different compared to the competitors has been standardized, continuously evaluated and improved
IN7	Building and maintaining client confidence of trustworthy and reliable	Trustworthiness and reliability from clients is not an important issue for the company	Various efforts are made to build and maintain client's confidence, but the process has not been standardized	Process for building and maintaining client confidence has been standardized and implemented well and fully supported by top management	Process for building and maintaining client confidence has been standardized, regularly evaluated and continuously improved
IN8	Maintaining relationships with clients	The company doesn't give attention to maintain good relationship with clients	The company maintains good relationships with clients but the process has not been standardized	Maintaining good relationships with clients has been defined in company standard and implemented well is fully supported by top management	Maintaining good relationships with clients has been defined in company standard and the process is regularly evaluated and continuously improved
IN9	Positioning on markets that are concerned about quality	Company does not care about quality	Company determining quality as its competitive advantage	Quality as important point to be successful in competition	Quality as competitive advantage been defined in

			but it has not been defined in company standard	has been defined in company standard	company standard, this policy is regularly evaluated and continuously improved
INNOVATIVENESS					
IN10	Carrying-out research and development activities	Research and development programme is not done consistently	The company carries out a research and development programme but it is not formally planned	The company has long term plans for research and development programme and this programme is fully supported by top management	Research and development programme has been well planned, regularly evaluated and continuously improved
IN11	Challenging staff to be innovative	Staff have not been challenged to create innovations	The company provide several programmes to challenge staff to create innovations but this programme has not been standardized	The company has standardized the programme for challenging staff to create innovations and this programme has been implemented well	Programmes that challenge staff to create innovations have been standardized, regularly evaluated and continuously improved
IN12	Supporting programmes that spark innovation	Programmes that encourage innovation have not been carried out	Programmes that encourage innovation have been carried out but have not been standardized	The company has standardized programmes that encourage innovation and these programmes have been fully implemented	Programmes that encourage innovation have been regularly evaluated and continuously improved
PROACTIVENESS					
IN13	Carrying-out marketing activities	Marketing activities are not done consistently	Marketing activities have been defined and implemented properly but they have not	Marketing programme has been standardized and should become a concern of every	Marketing programme has been standardized. Its implementation is regularly

			standardized	staff	evaluated and continuously improved
IN14	Expanding market segment	The company does not consider market expansion as an important issue	The company strives to expand its market segment but the programme to realize this plan has not been standardized	Expanding market segment is a company concern, the programme to realize this plan has been standardized	Programmes to expand market segment have been standardized. These programmes are regularly evaluated and continuously improved
IN15	Looking ahead to the future demands	The company pays less attention to the future demands and trends	Programmes for anticipating future demands and trends have been carried out but it has not been standardized	Programmes for anticipating future demands and trends have been standardized and implemented well	Programmes for anticipating future demands and trends have been standardized, regularly evaluated and continuously improved
IN16	Running business diversification	The company does not pay attention to new business opportunities	Company always actively looks for new business opportunities but the programme has not been standardized	Looking for new business opportunities is a part of formal planning of the company and it has been fully supported by top management	Looking for new business opportunities is a part of formal planning that is regularly evaluated and continuously improved
RISK TAKING					
IN17	Risk taking for innovation	The company tends to avoid innovation because of risk considerations	Innovation is developed continuously even though all of the risks has been realized	Risk taking for innovation has been defined in company standard and implemented well	Risk taking for innovation has been defined in company standard, that regularly evaluated and continuously improved

IN18	Risk taking for selecting clients	The company tends to reject projects from new clients because of risk considerations	The company takes a risk to accept a project from new client, as far as the risks have been evaluated	Risk taking behaviour of accepting projects from new clients has been declared in company standard	Risk taking behaviour of accepting project from new clients has been declared in company standard, regularly evaluated and continuously improved
IN19	Risk taking on financial aspects of the projects	The company tends to avoid projects with financial risk	The company takes a risk by taking a project with financial risk	Taking projects with financial risk has been declared in company standard and implemented well	Risk taking to take a project with financial risk has been declared in company standard, regularly evaluated and continuously improved
IN20	Risk taking on social aspects of the projects	The company tends to avoid projects with social risk	The company takes a risk by taking a project with social risk	Taking projects with social risk has been declared in company standard and implemented well	Risk taking to take a project with social risk has been declared in company standard, regularly evaluated and continuously improved
IN21	Risk taking on technical aspects of the projects	The company tends to avoid projects with technical risk	The company takes a risk by taking a project with technical risk	Taking projects with technical risk has been declared in company standard and implemented well	Risk taking to take a project with technical risk has been declared in company standard, regularly evaluated and continuously improved

5.5 ASSESSMENT INSTRUMENT

According to Paulk et al. (1993) CMM can be used as a foundation to develop tools, including questionnaires, that are useful for process improvement. Considering the applicability of CECM, this study develops a questionnaire based on CECM. The Corporate Entrepreneurship Capability Questionnaire (CECQ) is intended to collect people's opinions about the implementation of CE in their company. Then based on the data collected from CECQ, further analysis can be implemented to define several entrepreneurial characteristics of contractors.

The questionnaire consists of two main parts: respondent's background and the implementation of CE. The background of each respondent covers educational background, working experience and current position in the company. The main part of questionnaire consists of 21 questions that are adopted from the 21 indicators of CECM. Then each question has four choices of answer which is represented by four capability levels in each indicator. For each question, the respondent must choose one answer that best represents the real condition in the company. The guideline to answer the questions in both parts is written below the title of each part. This guideline will avoid errors in filling out the questionnaire. The complete questionnaire can be seen in Table 5-6

Table 5-6 Questionnaire

'CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL (CECM) FOR CONTRACTORS'
I. RESPONDENT BACKGROUND
Guideline: *Each question in this part should be answered by filling out the blank part or choose one answer that is in accordance with your current condition*
1. Working experiences in the construction industry: …….. years
2. Working experience in this company: …….. years
3. Education Background: a. Civil Engineering b. Architecture c. Others, please specify ……

4. Current position in the company

   a. President Director
   b. Director
   c. General Manager
   d. Manager
   e. Project Manager
   f. Others, please specify ……

5. How long have you been in the current position: ……. years

6. Gender
   a. Male
   b. Female

II. CORPORATE ENTREPRENEURHSIP INDICATORS

Guideline:
Please choose one out of four answer choices for every question in this part. The choice should be based on the condition that you have encountered in your company. In case there is no option that exactly represents the real condition in your company, please choose the closest one

1. Does the staff get authority to access the information or data that related to his/her job?

   a. No policy that supports the authority of staff to access information or data
   b. Information or data is accessible but the process has not been standardized
   c. The company standardizes the authority of staff to access information or data and fully supports this process
   d. Staff's authority to access information or data has been standardized and evaluated periodically and the process is continuously improved

2. Does the staff have the opportunity to communicate both vertically and horizontally through both formal and informal forums?

   a. Restricted freedom of communication within the company
   b. Communication within the company can be done easily but the process has not been standardized
   c. Communication within the company has been going well and the process has been standardized
   d. Communication process within the company has been standardized, regularly evaluated and continuously improved

3. Does the staff get an opportunity to propose suggestions that benefit the projects and companies?

   a. Only limited chance for staff to propose suggestions
   b. Staff members have an opportunity to propose suggestions but the process has not been managed properly
   c. The company has a standard provision that supports staff to propose suggestions, and top management considers the suggestions properly

d. Process that regulates staff to propose suggestions has been standardized, regularly evaluated and continuously improved

4. Does project team have autonomy to plan and manage projects in terms of procurement, interaction with clients, construction methods, human resources management, etc.?

a. Planning and managing project is not within the autonomy of the project team
b. The project team has autonomy to plan and manage a project independently but the process has not been standardized
c. Autonomy of the project team to plan and manage a project has been standardized and top management commit to implement it
d. Autonomy for the project team in planning and managing project has been standardized, regularly evaluated and continuously improved

5. Does the company help their clients to find the best way to resolve a client's problems, either technical, financial or other problems?

a. The company doesn't care about clients' problems
b. The company commits to help clients to resolve their problems but the process has not been standardized
c. The process for helping clients to resolve their problems has been standardized and the implementation gets full support from top management
d. The process for helping clients to resolve their problems has been standardized , fully supported by top management, regularly evaluated and continuously improved

6. Is the company able to offer something different than its competitors, such as: specialization in a particular project (irrigation, hotels, airports, etc.) as well as innovation (new construction methods, new materials, etc.)?

a. No effort for being different compared to the competitors
b. Policy to become different compared to the competitors has been carried out but this policy has not been formalized
c. Policy to become different compared to the competitors has been formalized and the implementation is fully supported by top management
d. Process to become different compared to the competitors has been formalized, fully supported by top management, regularly evaluated and continuously improved

7. Does the company strive to be trusted by clients because of its trustworthiness and reliability in completing projects?

a. Trustworthiness and reliability from clients is not an important issue for the company
b. Various efforts are made to build and maintain client confidence, but the process has not been formalized
c. Building and maintaining client confidence make up a formal programme and is fully supported by top management
d. The process of building and maintaining client confidence is a formal programme that fully supported by top management, regularly evaluated and continuously improved

8. **Does the company strive to maintain a good relationship with clients with the aim of getting repeat order?**

    a. The company doesn't give attention to maintain good relationships with clients
    b. The company maintains good relationships with clients but the process has not been formalized
    c. Maintaining good relationships with clients is a part of the company's formal policy and the implementation is fully supported by top management
    d. Process for maintaining good relationships with clients is a part of formal company policy that is fully supported by top management, regularly evaluated and continuously improved

9. **Does the company position itself in a market that concerned about quality; therefore the company delivers better quality to clients rather than the cheaper price?**

    a. The company does not care about quality
    b. The company determines quality as its competitive advantage but it has not been defined in company standard
    c. Quality as an important point for success in competition has been defined in company standard
    d. Quality as competitive advantage been defined in company standard, this policy is regularly evaluated and continuously improved

10. **Does the company conduct research and development programmes to create new products and / or services with the aims to achieve the efficiency and effectiveness of projects and to meet customers' demands?**

    a. No research and development programme
    b. The company carries out research and development programme but without formal planning
    c. The company has long term plans for research and development programme which is fully supported by top management
    d. The company has long term plans for research and development programme which is fully supported by top management, regularly evaluated and continuously improved

11. **Does the company challenge staff members to create innovations through an appropriate rewards system such as: bonus, recognition, promotion, etc.?**

    a. No challenge for staff to create innovations
    b. The company provides an appropriate rewards system to challenge staff to create innovations but this programme has not been formalized
    c. The company has formalized a programme challenging staff to create innovations that is fully supported by top management
    d. Programmes that challenge staff to create innovations have been formalized, regularly evaluated and continuously improved

12. **Does the company encourage innovation through programmes such as: hiring experts, staff training, setting a target, forum for knowledge sharing, etc.?**

    a. No programme for encouraging innovation

b. Programme encouraging innovation has been carried out but it has not been formalized
c. The company has formalized a programme that encourages innovation and it is fully supported by top management
d. Programmes encouraging innovation have been formalized, regularly evaluated and continuously improved

13. Does the company actively carry out marketing activities, such as: developing marketing department, developing company website, sending company profile to potential customers, seeking information about new projects, etc.?

a. Marketing activity has not been carried out
b. The company carries out a marketing programme but this programme has not been formalized
c. The company has a marketing programme that has been standardized and fully supported by top management
d. The marketing programme has been standardized, fully supported by top management, regularly evaluated and continuously improved

14. Does the company look for an opportunity to get projects in new segments and new areas?

a. The company plays in an existing market only
b. Expanding market has been done actively but it has not been formalized
c. Expanding market is a formal programme of the company that is fully supported by top management
d. The programme for expanding market has been standardized, regularly evaluated and continuously updated

15. Does the company anticipate future demands and trends, such as: ISO Certification, Green Project Concept, etc.?

a. The company pays little attention to the future demands and trends
b. A programme for anticipating future demands and trends has been carried out but it has not been formalized
c. A programme for anticipating future demands and trends has been formalized and top management fully supports this programme
d. A programme for anticipating future demands and trends has been formalized, fully supported, regularly evaluated and continuously updated

16. Does the company actively look for new business opportunities that are still related to the contractor business, such as: heavy equipment, property developer, precast concrete, etc.?

a. The company does not pay attention to new business opportunities
b. The company always actively looks for new business opportunities but the programme has not been formalized
c. Looking for new business opportunities is a part of formal planning of the company and it has been fully supported by top management
d. Looking for new business opportunities is a part of formal planning that is fully supported by top management, regularly evaluated and continuously updated

17. **Does the company take a risk by introducing innovation with uncertain outcomes, such as: new construction methods, new materials, etc., to achieve the efficiency and effectiveness of projects and to meet customers' demands?**

    a. The company tends to avoid innovation for fear of the risks
    b. Innovation is developed continuously even though all of the risks have been realized
    c. Risk taking for innovation is defined in company's standard
    d. Risk taking activity for innovation that is defined in company's standard is regularly evaluated and continuously improved

18. **Is the company willing to take a risk by accepting projects from new clients?**

    a. The company tends to reject projects from new clients for fear of the risks
    b. The company takes a risk to accept a project from a new client, as far as the risks have been evaluated
    c. Risk taking behaviour of accepting project from new client has been declared in company's standard
    d. Risk taking behaviour of accepting project from new client has been declared in company's standard, regularly evaluated and continuously improved

19. **Does the company take a project with a financial risk, such as: late payment, un-stable economic conditions, changes in materials' prices etc.?**

    a. The company tends to avoid projects with financial risk
    b. The company takes a risk by taking project with financial risk
    c. Taking projects with financial risk has been declared in company's standard
    e. Risk taking to take project with financial risk has been declared in company's standard, regularly evaluated and continuously improved

20. **Does the company take a project with social risk, such as: environmental issues, impact on society, etc.?**

    a. The company tends to avoid projects with social risk
    b. The company takes a risk by taking a project with social risk
    c. Taking projects with social risk has been declared in company's standard
    f. Risk taking to take project with social risk has been declared in company's standard, regularly evaluated and continuously improved

21. **Does the company take a project with technical risk, such as: construction method difficulties, materials shortage, lack of experts, etc.?**

    a. The company tends to avoid projects with technical risk
    b. The company takes a risk by accepting project with technical risk
    c. Taking projects with technical risks has been declared in company's standard
    g. Risk taking to accept project with technical risk has been declared in company's standard, regularly evaluated and continuously improved

5.6 THE ASSESSMENT PROCEDURE FOR CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL

CECM can be used to assess entrepreneurial characteristics of contractors for both internal and external purposes. Every assessment is addressed to its specific purpose and follows a different process. Further explanation about assessment for internal and external purposes is discussed in the following sections.

5.6.1 The Procedure for Self-Assessment

The internal purpose is directed to self-assessment that is intended to understand the existing capability level of contractors to implement each key factors of CE. Then these levels are compared with the target levels that are defined by top management based on the vision of the company. The gap between existing and target capability levels can be used to develop strategy to move forward.

This study proposes a three stage self-assessment process. Those stages are: preparation, execution and post execution. Figure 5-6 shows the whole procedure of self-assessment.

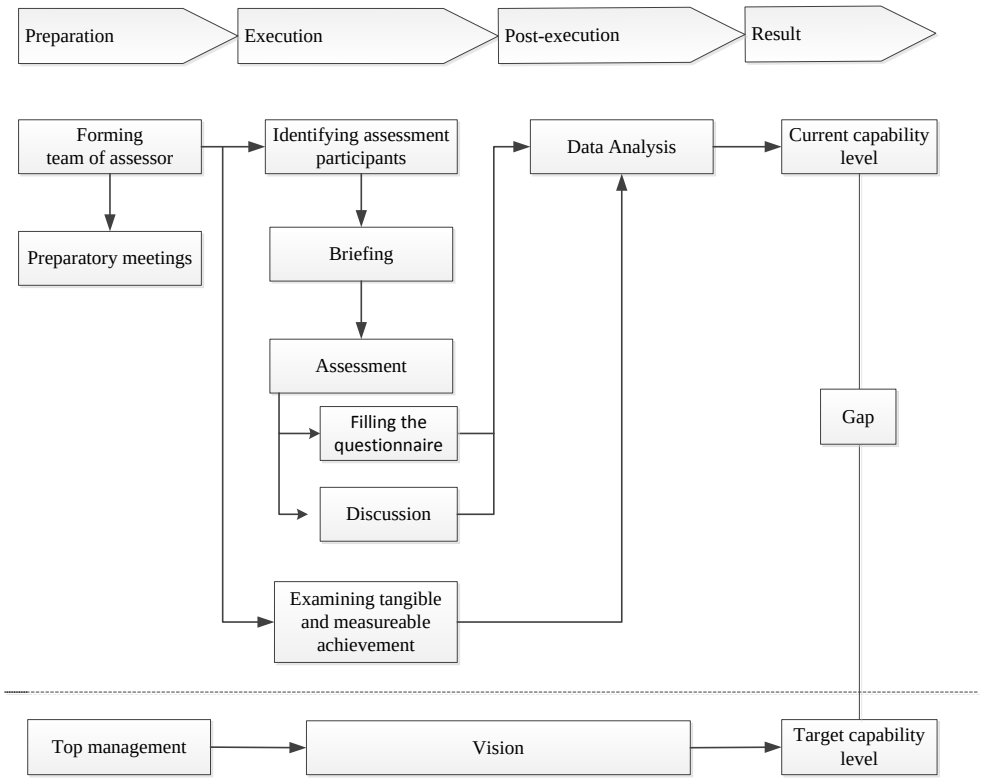


Figure 5-6 The procedure for self-assessment

5.6.1.1 Preparation stage

The preparation stage begins with the formation of a team of assessors (TA) which will be involved intensively in the assessment process. The TA should consist of representatives from different levels of management. Top level of management should be involved because they are the most concerned party with this assessment; however lower level of management should also be involved because they are closer to the staff therefore their involvement will facilitate the process.

The team starts their activity by holding preparatory meetings to design the most appropriate process, to anticipate and to find the solution for any potential problem and to bring every member to a common level of understanding about the model and procedure of assessment. This stage is very important to be carried out in order that the assessment process will run smoothly and achieve the target goals.

5.6.1.2 Execution stage

The following stage involves execution of assessment. It starts with appointing participants who will be involved in the survey. The participants should be staff members from different levels of the organization to obtain objective and unbiased results. TA members cannot participate in the assessment. After the participants are designated, they will be briefed by the TA members. During briefing, the explanation and the guidelines about the purpose and the process of assessment are provided to the participants in order to make them have a common shared perception about the model and assessment process.

Then the assessment is conducted through filling out the questionnaire and holding discussions. For each question in the questionnaire, participants should choose one answer that represents the real situation and condition that are faced and perceived during their work in the company. Filling out the questionnaire is accompanied by a discussion between participant and the TA member. During the discussion, the participant should provide justification for his or her choices. The discussion can minimize errors in filling out the questionnaire because during the discussion the TA member has a chance to provide clarification to the participant. In addition, discussion will provide deeper explanation of every key factor. Furthermore, to provide more accountable results, the staff member's personal perception will be confirmed and

supplemented by the data derived from tangible and measureable achievements, such as: annual reports, company profile, manuals, etc.

This part of the assessment is directed to find the existing capability level of contractor in order to implement CE. Later this result will be compared to the target capability levels that are defined by top management of the company based on its vision.

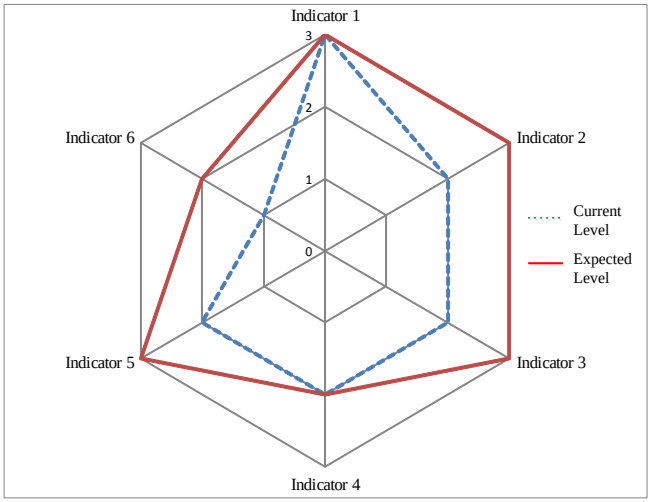
5.6.1.3 Post-execution stage

The data from the responses to the questionnaire are analysed using simple statistics such as means and standard deviations; then the results of the statistical analysis are justified and enriched by the result of discussions and data from the company's real achievements. Based on the results of data analysis, the TA identifies the company's existing capability level to implement CE and hence the entrepreneurial orientation of that contractor.

In order to provide a clear picture of the CE capability levels, the results are proposed to be presented in radar diagram or bar-chart format. By using both diagrams, the capability level in each indicator, as well as, the gap between existing and target capabilities can be seen clearly. This will enable the contractors to come up with strategies to achieve their target levels. The examples of radar diagram and bar chart are presented in Figure 5-7.

5.6.2 The Assessment Procedure for External Purpose

In addition to the self-assessment procedure, the assessment procedure for external purpose needs to be clarified. The assessment by external parties has a different purpose and interest; usually it is aimed to judge the performance of contractors for a purpose such as contractor classification, contractors pre-qualification, etc. Example of the external parties that are concerned with this assessment: association of contractors, government agencies, prospective clients, etc.



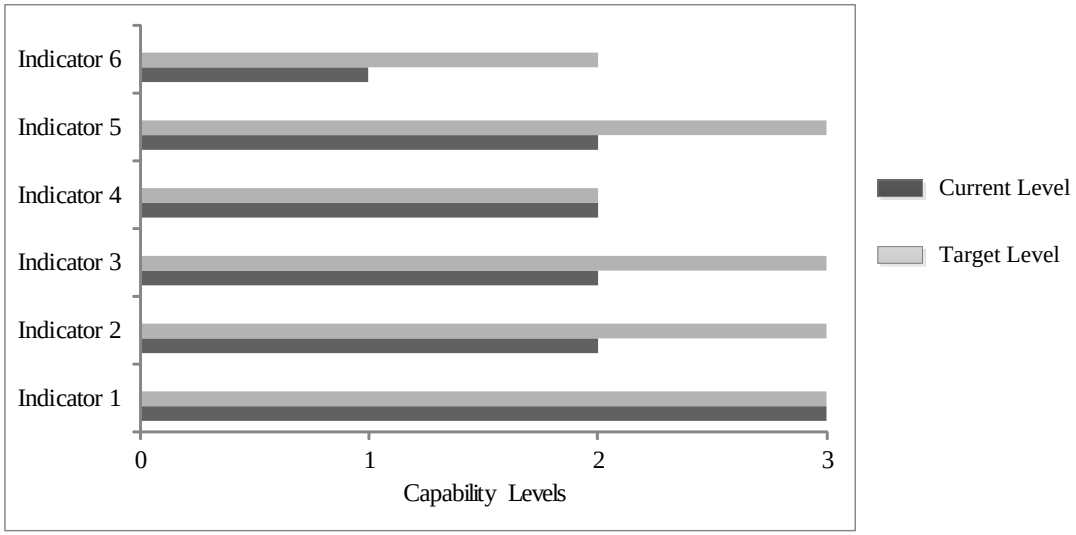


Figure 5-7 Example of diagram for presenting self-assessment results

For this purpose, usually contractors tend to show their performance as good as possible in order to reach a position that is as high as possible; therefore the determination of people who will participate in the survey, as well as the justification from tangible and measureable achievement become very important issues.

However the procedure of assessment for external purposes is similar to the procedure for self- assessment, particularly the procedure for determining the existing capability. Figure 5-8 presents the procedure for external assessment.

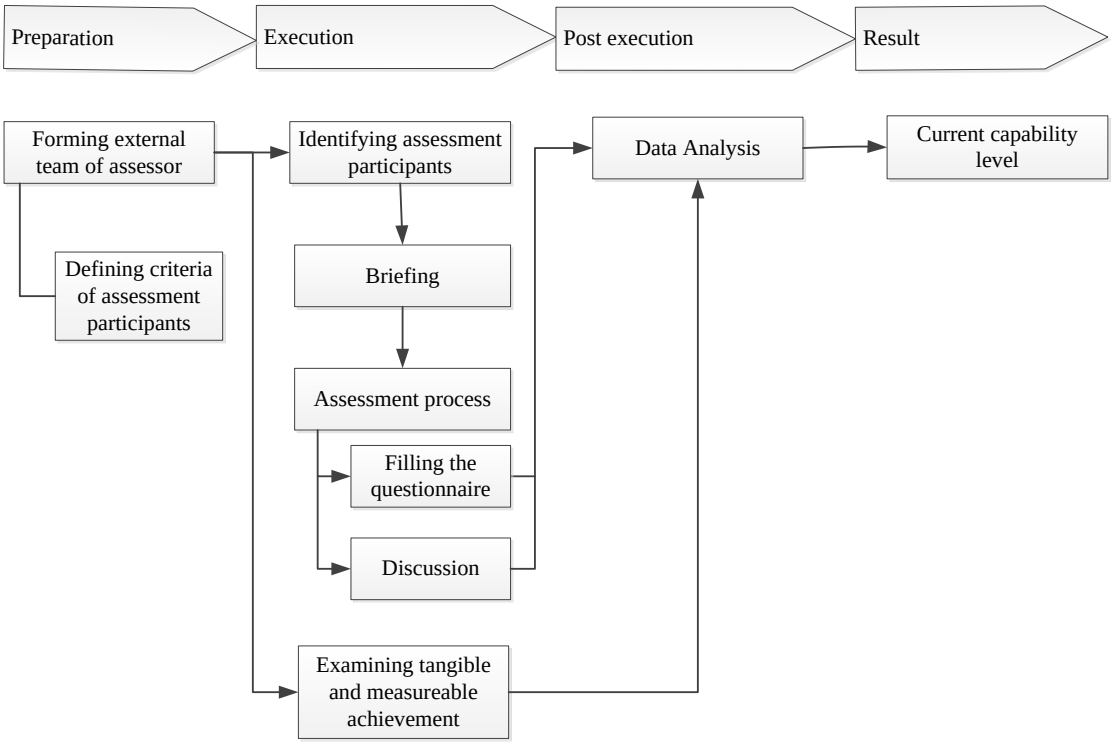


Figure 5-8 The assessment procedure for external purpose

Compared to the internal assessment, they are different in some parts only.

1. The TA for external assessment is not formed from the people within the company but they are from the external party

2. The identification of assessment participants is based on the criteria provided by the external team. The top management can be involved as participants

3. A thorough briefing to clarify the purpose and procedure of the assessment is carried out by the external team

4. The result will be the existing condition only, as the external party cannot come up with a vision for a company

In this particular case, the main challenge for external assessors is how to get a chance to access resources that are necessary to conduct the assessment; especially if the company wishes to hide something.

5.7 SUMMARY

The CECM has been developed based on the principles of the CMM. This model uses 21 key factors of CE as the indicators to measure the capability level of contractors to implement CE. CECM categorized the capability of contractors to implement each indicator of CE into four levels, started from initial or ad hoc to repeatable, then managed, and finally optimized. Based on 21 indicators and 4 capability levels, the assessment criteria for each indicator in each level are defined in the matrix framework of CECM.

In addition, this study also prepared the assessment process as a supplement of CECM framework. The assessment process was considered the implementation of this model for both self-assessment and external purposes. In order to conduct the assessment, both procedures need proper instrument, therefore this chapter also explained the questionnaire that has been developed to support the assessment process. Chapters 6 and 7 will present validation of the CECM using two different approaches: expert review and case study.

Chapter 6 - VALIDATION OF CORPORATE ENTREPRENEURSHIP CAPABILITY MODEL

6.1 INTRODUCTION

Validation is the important part of research for assessing the quality of a model in order to ensure the trustworthiness of that model. An expert review was chosen as the optimal to validate the CECM. This chapter presents in detail the implementation and the results of the expert review implemented to validate the CECM.

The explanation starts from the aim and objectives of the expert review in this study. Then it is followed by the methodology to implement the review, the profile of experts who were involved in the CECM validation exercise and the results found from the expert review that were used to refine CECM. The review covered three main components of CECM: indicators, capability levels, and assessment criteria. Additionally, the results of the expert review regarding indicators of CECM were also used to refine the key factors of CE.

6.2 EXPERT REVIEW AIM AND OBJECTIVES

The expert review of the CECM was conducted by asking the opinions, receiving suggestions, as well as comments from the experts about the model. In particular, the expert review's objectives are directed to gather experts' comments and constructive ideas on

- The indicators of CECM that are also considered as key factors of CE
- Capability levels in the CECM with which to categorize the capability of contractors for each indicator of CE
- The assessment criteria that are developed in CECM to assess the capability of contractors for each indicator of CE

6.3 METHODS ADOPTED FOR EXPERT REVIEW

This study used academics as experts to review the CECM. Each of the ten reviewers was considered as a subject matter expert because they have broad and deep knowledge of the subject under study; but they were not considered as prospective respondents for inclusion in the study. The expert review conducted in this study follows the process as presented in Figure 6-1.

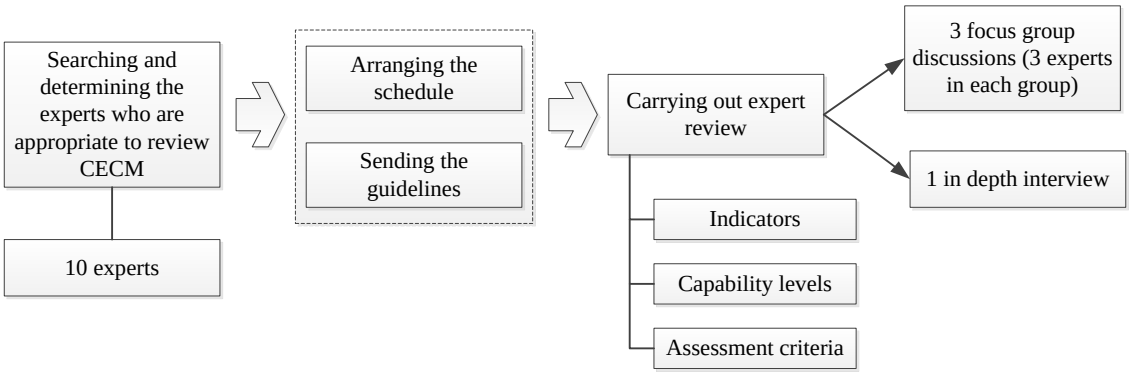


Figure 6-1 The process of expert review

The process was started by determining the academic members who would be involved in this study in the role of expert. They should meet several criteria: high level of experience in both teaching and research, education background in construction management with additional experience in the construction industry. These criteria were assigned in order to get the experts who have enough knowledge about business in construction. After searching and contacting several academics who are considered appropriate to be involved in this study, 10 academics were confirmed to participate.

The experts were contacted to arrange the schedule and to discuss the process of interviews. It was agreed that the interview will be conducted in a group session. However, not all of them can follow a focus group discussion due to time constraints. Based on consideration of schedule and location, finally three face to face focus group discussions with three experts in each group and one face to face personal interview are carried out. Before conducting the focus group discussions and interview, the CECM matrix was sent to each expert in order to provide their initial overview of the model to be reviewed. Figure 6-2 presents the process of the focus group discussions and interview conducted in this study.

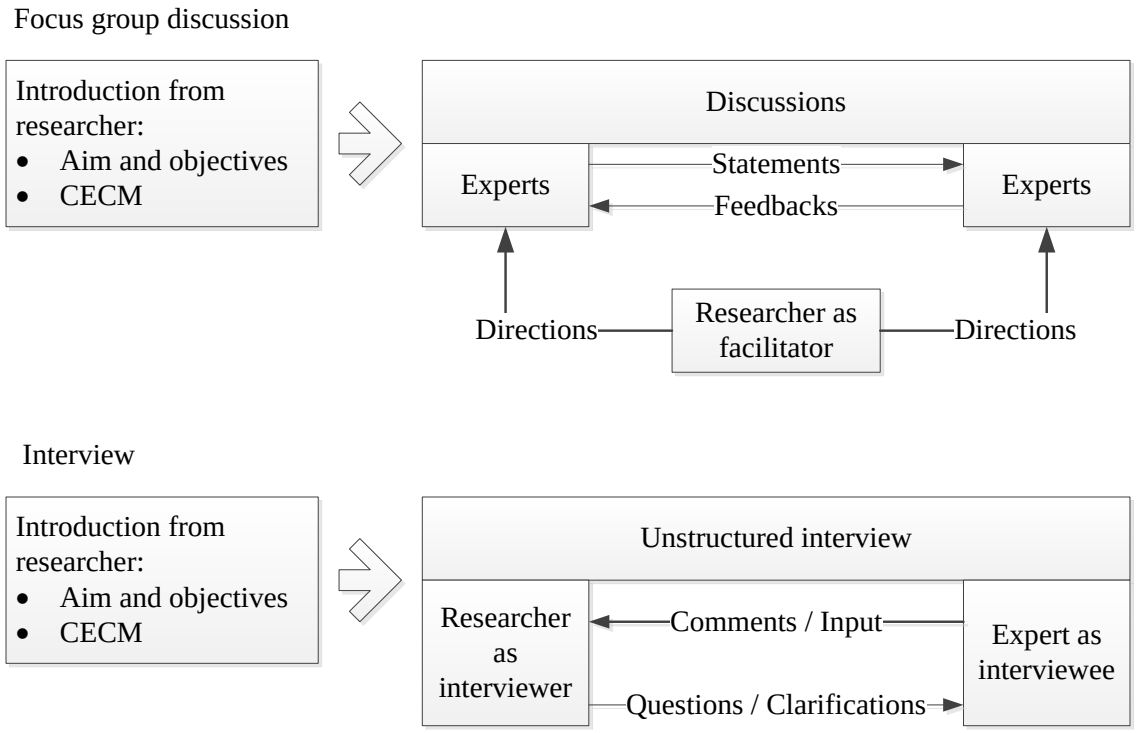


*Figure 6-2 The p*rocess of focus group discussion and interview

During the three focus group discussions, the researcher had a role as a facilitator. Each session started by explaining the aim of the discussion and then followed by introducing the CECM concept in brief in order to give each academic a better understanding about the model. Before discussion started the participants had a chance to clarify any matters that were unclear to them. Then the discussion was run normally, the participants gave comments on CECM, especially in terms of the indicators and the levels of capability, as well as the assessment criteria that were developed in the model. Each indicator was discussed one by one. The participants made comments on the opinion of other participants and exchanged ideas. The researcher, as facilitator, just redirected the discussion to the right track when the discussion was out of focus; or started another discussion and induced a question if the discussion had stalled.

The interview was conducted in the similar way. It was started by explaining the aim of the interview and then followed by introducing the CECM in brief in order to give the single expert a better understanding about the model. Then the interviewee had

a chance to provide his comments and inputs on the model with a special focus on each indicator, levels of capability and assessment criteria. During the interview, the interviewer just asked inducement questions to the interviewee in order to start and to facilitate the interview. Answers from interviewee were clarified when the answer was not clear enough or out of topic. Both the focus group discussions and interview were fully audio-recorded to facilitate the analysis of discussion and interview in order to attain a better result by ensuring that no expert information was lost.

6.4 PROFILE OF EXPERTS

Ten subject matter experts were involved in this study to give their comments and suggestions on the CECM. These experts are academics with construction management practice, research and teaching background who are working as lecturers in universities in Indonesia. They are very experienced in research and teaching as well as having experiences in construction industry. The profile of these experts can be seen in Table 6-1.

The previous section mentioned this validation method used three focus group discussions and one interview to gather the expert's comments and inputs. Among these ten experts, the distribution of them into three focus group discussions (FGD1, FGD2, FGD3), and one personal interview are presented in Table 6-2.

6.5 THE ANALYSIS OF THE EXPERT REVIEW

Analysis of focus group discussions and interview was done by carefully listening to the audio-recordings two times. After the main ideas from each discussion and interview were captured, the audio-records were re-listened, while the important points that emerged from the discussions and interview were noted.

Furthermore those key important points were compared to the model to get an idea to change and to refine each component of the CECM. In addition, the names, the definitions and the explanation of CE key factors were also reviewed and refined. In case more explanations were needed, the audio-record for that part was re-played. Figure 6-3 presents the process undertaken to analyse the results of the expert review.

Table 6-1Experts profile

No.	Experts	Current Position	Experiences in Teaching and Research	Practical Experiences	
				Past	Current
1	Expert 1	Associate Professor	27 years	Site manager	Project consultant
2	Expert 2	Assistant Professor	28 years	Site manager	Project consultant
3	Expert 3	Assistant Professor	15 years	No information	Project consultant
4	Expert 4	Senior Lecturer	20 years	Contractor staff	Director of CM company
5	Expert 5	Senior Lecturer	25 years	Project manager	Developer owner / Project consultancy
6	Expert 6	Senior Lecturer	20 years	Project manager	Contractor owner / Project consultant
7	Expert 7	Professor	17 years	No information	Project consultant
8	Expert 8	Associate Professor	22 years	Project manager	Project consultant
9	Expert 9	Associate Professor	29 years	Site manager	Project consultant
10	Expert 10	Associate Professor	20 years	No information	Project consultant

Table 6-2 The distribution of experts during FGDs and interview

No.	FGD or Personal Interview	Expert/s
1	FGD1	Expert 1, Expert 2 and Expert 3
2	FGD2	Expert 4, Expert 5 and Expert 6
3	FGD3	Expert 7, Expert 8 and Expert 9
4	Personal interview	Expert 10

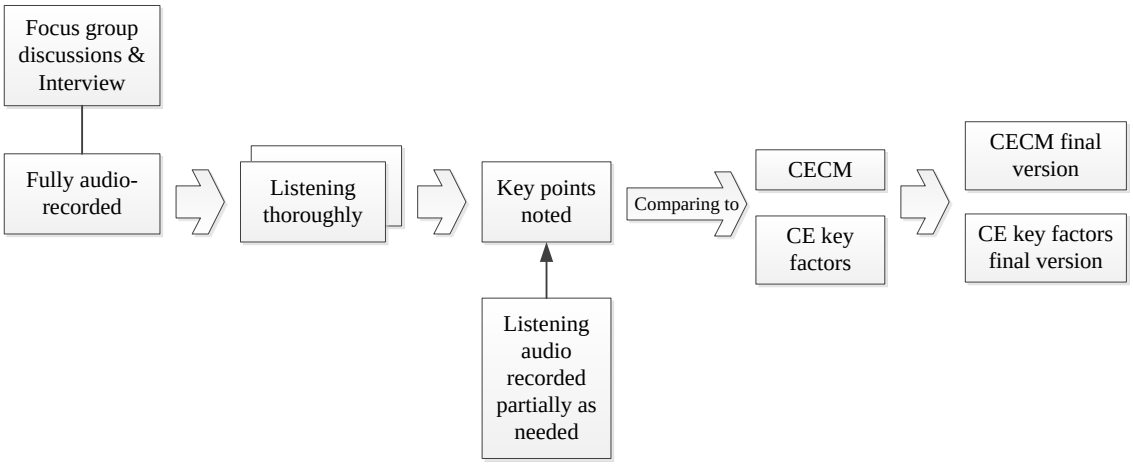


Figure 6-3 The process of expert review analysis

6.6 THE FINDINGS FROM THE EXPERT REVIEW

After reviewing the comments and constructive inputs from the experts and then comparing them to the existing model and key factors of CE, the following findings were noted. The findings can be grouped into five categories: CE for contractors, CECM in general, CECM indicators or CE key factors, levels of capability and CECM assessment criteria. All of these findings are presented and explained in detail as follows.

General comments and inputs for CE for contractors

1. Experts expect that the findings of this study will give a different idea about contractors, that usually considered as a company with low innovation, resistance to change, and not as risk takers.

2. Experts anticipate that the capability to implement CE will be one of the requirements for bidding participants, especially for a project with high risk.

3. Experts are convinced that contractors in Indonesia have been implementing efforts to achieve CE even if not fully.

General comments and inputs for CECM

1. Experts considered that 21 indicators and four levels of capability in CECM are reasonable to indicate the application of CE in a contractor.

2. Experts suggested the best way to assess the CE capability is through external assessors to increase the trustworthiness of the results. If that option is not possible, then the self-assessment must be done properly to minimize biased results. For example: the staff members that fill the questionnaire must be accompanied by the assessor to ensure that the question has been well understood.

3. Experts considered CECM as a model that was developed based on the spesific conditions of construction industry in Indonesia where repeat orders from existing clients are a potential source of new projects. In this particular condition, good relationshipship with clients and clients' trusswortiness are important to be built and maintained. However, experts noted this strategy cannot be implemented by contractor when dealing with clients from the public sectors. In Indonesia, the procurement of projects from the public sectors should use open tender system.

4. Experts considered the situation-specific words, sentences and jargons in CECM are understandable and commonly used in construction industry.

CE key factors or CECM indicators

1. Experts suggested to include knowledge in addition to data and information in the definition of KF1 or IN1 (autonomy for accessing information) because they considered accessing knowledge is important in addition to data and information. They also asserted that the autonomy for accessing information should be granted by considering the position, duties and responsibilities of staff members. Experts also mentioned that the company's management should support this autonomy by providing a proper information retrieval system.

2. Experts found that KF3 or IN3(autonomy for proposing suggestions that benefit the projects and companies) only considers the autonomy of individual staff, therefore they suggested to include the autonomy of company stakeholders, such as branch offices and project teams to propose suggestions.

3. Experts were concerned that KF9 / IN9 (positioning in a particular market) overlaps with KF6 / IN6 (being different compared to competitors). Both of them are related to contractor specialisation. They also consider that KF9 / IN9

contradicts KF14 / IN14 (expanding market segment) because KF9 / IN9 is concerned to narrow market while KF14 / IN14 is concerned with a wider market. After discussing further about the meanings behind those key factors, it was considered to change the name of KF9 / IN9 into 'positioning on a market that is concerned about quality'.

4. Experts mentioned that in KF12 or IN12 (supporting programme that encourage innovation), knowledge management is an important aspect to be considered in addition to knowledge sharing because knowledge that is managed properly can be easily utilized by others; therefore it can be the basis of the creation of other innovations.

5. Experts asserted that marketing activity for contractors is different compared to other businesses. Contractors have the opportunity to get a project only when the project is offered by the owner; therefore they cannot use a direct selling marketing approach, such as putting billboards in public areas. The marketing approach that is most appropriate for contractors is marketing intelligence, which is aimed at discovering information about project availability. After the opportunity is identified, it is followed by proactive actions such as sending the company's profile to the prospective client or doing a presentation, or both. Experts suggested to mention marketing intelligence in the explanation of KF13 or IN13 (carrying-out marketing activities)

6. Experts noted that risk taking (KF17 to KF21 or IN17 to IN21) cannot be interpreted only as a bold action to take a risk but risk taking behaviour should be accompanied with careful consideration and anticipative protective actions.

Levels of maturity

1. Experts suggested to rename the capability levels L1 to L4 instead of L0 to L3 because it's easier to people to consider first level as level 1 rather than level 0, therefore named first level as L0 will confuse the user.

2. Experts considered that using 4 capability levels to categorize capability of contractors to implement CE is reasonable but they suggested re-considering the name of the highest level. According to them, using 'optimized' for the highest

capability level is better rather than ‘continuous improvement’ because ‘optimized’ covers wider meaning compared to ‘continuous improvement’.

Assessment criteria

1. Experts found the use of different words for the same meaning in several criteria, such as ‘standardized’ and ‘formalized’, makes the user confuse. The experts suggested the uses of same word instead of those two different words.

2. Experts doubted about the last phrase of assessment criteria for IN3 at level 2. The phrase ‘top management considers the suggestions from staff properly’ is difficult to interpret therefore it was suggested to be improved.

Based on the inputs from experts, the model has been evaluated and refined. This model retained the use 21 indicators and 4 capability levels to assess the capability of the contractor to implement CE. Refinement of the model was done for the names of one key factor or indicator; for the definitions of five key factors or indicators, as well as the names of capability level and the assessment criteria. The whole refinement that has been done to CECM is explained as follows.

Capability level is changed from L0, L1, L2 and L3 to L1, L2, L3 and L4. ‘Optimized’ is the new name of L4 instead of ‘continuous improvement’. The names and definitions of some key factors or indicators were redefined as follows:

1. The definition of KF1 or IN1 (autonomy for accessing information) was extended. Knowledge is added as a complement to information and data.

2. The definition of KF3or IN3 (autonomy for proposing suggestions that benefit the projects and companies) covered only the autonomy of individuals. This definition was extended to the autonomy of teams as well.

3. The name of KF9 or IN9 (positioning in particular market) was refined becoming ‘positioning in markets concerned about quality’, as a consequence, the definition was also adopted as the company promises better quality rather than cheaper price compared to its competitors; therefore, it does not worry about being abandoned by a client simply because it offers a relatively higher price.

4. The definition of KF12 or IN12 (supporting programmes that encourage innovation) was extended by adding knowledge management in addition to knowledge sharing

5. The definition of KF13 or IN13 (carrying-out marketing activities) now includes ‘marketing intelligence’ as an appropriate marketing approach for contractors

6. The definitions of KF17 to KF21 or IN17 to IN21 about risk taking now include that ‘bold action to take a risk should be an action that has been fully considered’.

The definitions of the following assessment criteria were refined:

1. ‘Standardized’ is used instead of ‘formalized’ to mention the condition of every indicator at capability level 3 and 4

2. The assessment criteria for IN3 was changed from ‘top management considers the suggestions from staff properly’ to ‘the suggestions have been accommodated properly’

The names and the definitions of key factors that were presented in Chapter 4, as well as the indicators, the levels of capability and the assessment criteria of CECM that were presented in Chapter 5, have been refined based on this expert review. The CECM will also be refined based on the feedback obtained from industry professionals who took part in case studies that will be presented in Chapter 7.

6.7 SUMMARY

The expert review exercise has been carried out in this study to validate the model. Ten academicians from several universities in Indonesia have been appointed as a subject matter expert to review the model. The review was done through three focus group discussions and one face-to-face interview. The experts were asked to give opinions, suggestions, and comments on CECM in general and particularly on the indicators that were adopted from key factors of CE for contractors, capability levels and assessment criteria.

The main finding is that all experts appreciated the establishment of the model and looked forward to the model making a positive impact to the construction industry. All of them agreed that the indicators, capability levels and assessment criteria in the model are satisfactory and the language that is used to develop the model is understandable.

Instead of all positive comments, they also give several comments and suggestions that required the model to be modified. Based on their feedback, the names and definitions of some key factors or indicators have been refined. The name of highest capability level used in CECM was changed, and some assessment criteria of the CECM were restated. After the final version of the CECM has been constructed, it will be pilot-tested with three contactors in Indonesia in order to assess its practical application. The case study to assess the practical application of the CECM will be presented in the following chapter.

Chapter 7 - CASE STUDIES

7.1 INTRODUCTION

The previous chapter discussed the expert review exercise undertaken to validate the CECM. In addition to model validation using an expert review, the practical application of CECM is also assessed using a case study approach. This chapter presents the case studies carried out for this reason. Three contractors in Indonesia have been chosen for the case study. These three contractors conduct their business very well and in a sustainable manner. Some staff members from different level in each contractor have been chosen to participate in this case study. Finally the results of the case studies as well as the feedback from construction professionals, are presented.

7.2 AIM AND OBJECTIVES OF THE CASE STUDIES

Case studies in this study are focused on the assessment of the practical applicability of the CECM. In addition, the three case studies are intended to examine the problems that may emerge from the model, such as: inappropriate indicators or confusing terminologies; as judged from the the construction professionals' point of view. Then based on the feedback from the case studies, the CECM was refined so that the practical applicability of the model could be maximized.

The case studies are directed to the following objectives:

1. To measure the capability level of contractors to implement the indicators of CE

2. To explore the implementation of each indicator of CE in every contractor that is involved in these case studies, in order to obtain a deeper understanding about the condition of every contractor to implement CE

3. To analyse the results of the case studies through some statistical criteria in order to assess the practical applicability of the CECM

4. To gather the feedback from construction professionals in order to validate and to refine the CECM.

7.3 PROCESS AND ANALYSIS OF CASE STUDIES

In accordance with the objectives of the three case studies, as explained earlier in this chapter, the case studies were conducted following the process as presented in Figure 7-1. The process followed the process of self-assessment that has been presented in Chapter 5. However some modifications have been implemented to adapt the conditions and the purpose of the case studies reported in this chapter. The adjustments from the original self-assessment process are as follows:

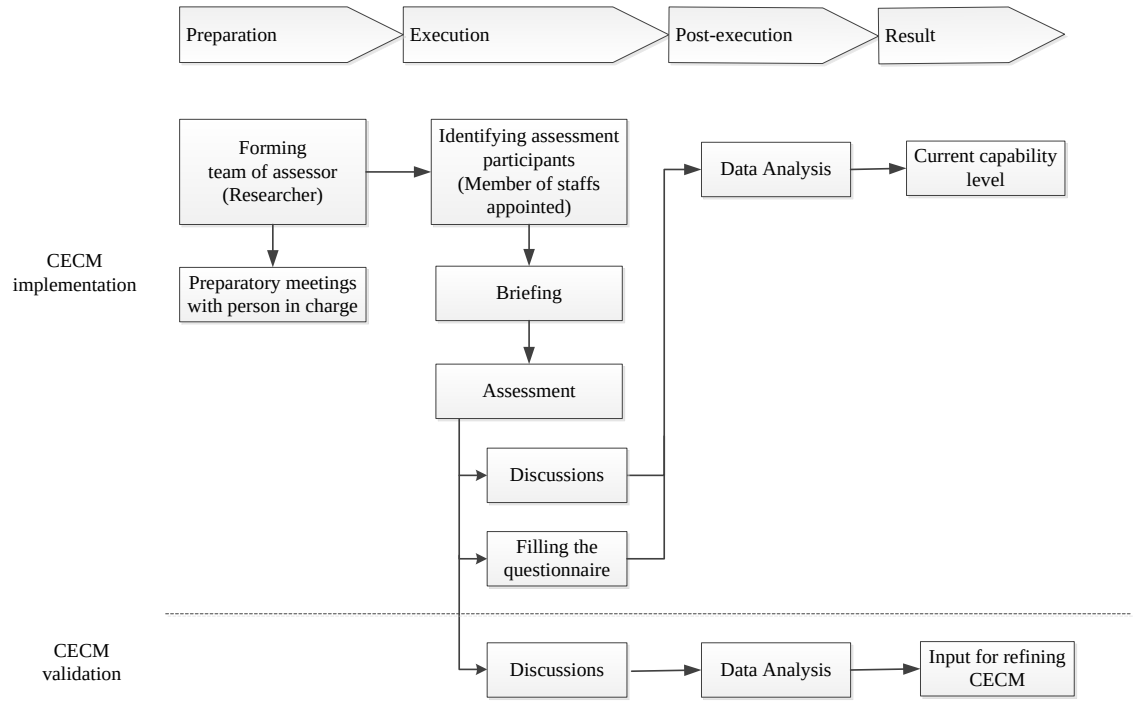


Figure 7-1 The procedure of the case studies

1. The assessor in these case studies was the researcher because this assessment is aimed at the case studies, not to the real self-assessment.

2. The tangible and measurable data were not examined due to accessibility constraint and time limitation.

3. The target capability levels that are determined by top management were not examined

4. In addition, discussion with the participant to gather feedback on CECM is conducted because this case study also aimed to validate the model. The discussion for this purpose is enriched by researcher's observation designed to note enablers and barriers of CECM application that were raised during the process

The process started by determining contractors who will be involved in the case studies. Two main criteria for selecting contractors are: company size and business sustainability. In addition to those criteria, the accessibility of the contractors to the researcher also needs to be considered.

Big contractors are chosen to participate in this case study because they are considered as contractors which run several activities and determine several strategies that are corroborate to the implementation of CE. The sustainability of their business also considered as an important criterion because the findings of this study will be generated from the experiences of successful contractors gained from running their businesses.

Accessibility means the contractor must allow the researcher to access members of staff who will be involved in the study, as well as to information that needed. The accessibility of contractors depends on top management support, because every activity in these three case studies will only run well with the permission of top management.

Top management of contractors usually support academic activities, if they realize that research is important for both the academic and industrial worlds: a win-win outcome. One director of a participating contractor mentioned that his company always supports any research activities because they realize there is a mutual relationship between industry and academia. Industry cannot be survive without qualified human resources that are produced by academic institutions.

After a list of eligible contractors was identified, they were approached formally and informally for permission to carry out a case study in that contractor. The informal approach was done by contacting people who are known by the researcher, while the formal approach was done by sending a formal letter to get the permission. Finally three

contractors confirmed their willingness to be involved in a case study. Each contractor appointed a person to be in charge in order to facilitate this case study. The staff member in charge from each contractor were as follows:

1. Contractor 1: Director of Human Resources, Personnel Administration and General Affairs

2. Contractor 2: Human Capital Manager

3. Contractor 3: Operation Director

After the participating contractors were identified, conducting the case studies followed the process outlined in Figure 7-1.

7.3.1 Preparation Stage of the Case Studies

The process started with arranging a preparatory meeting with the person in charge, from each contractor, to arrange the schedule, to discuss the process of data collection and to determine the staff members to be involved in the case study. In order to achieve a valid result, the staff members should be construction professionals from a variety of different positions, whether they were working in the office or at the project site. After the schedule was agreed and the participants were appointed, the questionnaires were sent to the participants to give them an overview of the study.

7.3.2 Execution Stage in the Case Studies

The execution stage started from appointing and contacting participants of the case study. This step was done by the person in charge in each contractor. Then the process of assessment was carried out; however each contractor has their own preference to bring together the researcher and the participants in each case study. The meetings in each contractor arranged in different ways as follows.

1. Contractor 1 arranges meeting between the researcher and participants in head office and project sites, depending on where the participants are working

2. Contractor 2 invited all participants to meet the researcher in the head office

3. Contractor 3 invited all participants to meet the researcher in one project site

The assessment process started with a briefing to provide an overview, to clarify the purpose and to explain the process of the case study. It was done by the researcher to with each participant, before filling out the questionnaire and holding the discussion.

Then the assessment process was conducted by filling out the questionnaire and then having a discussion with the participants one by one; a format designed to ensure the confidentiality and to avoid mutual influence between the respondents. The questionnaire used in this case study has been explained and can be seen in Chapter 5. Filling out the questionnaire and holding a discussion were carried out simultaneously. The participants answered the questions in the questionnaire one by one and for every answer they were asked to provide the reason behind the answer and the examples that supported their choice. The discussion is intended to justify and to enrich the findings from the questionnaire.

As an example, one respondent from contractor 1 rates his contractor at level 4 for indicator 6 (being different compared with competitors). He justified his choice by providing the following statement:

> *'We provide different services compared with competitors and the competitors start to follow us. We always seek a breakthrough for improvement because we have a principle when the tiger chases us, we shall run faster and always keep our position in front of the tiger, otherwise we shall be eaten up. One example of our advantage is the neatness and cleanliness of the projects. Competitors try to imitate this principle, but it is not easy because it needs to be cultivated and it needs special cost. We continuously improve this principle; previously we declare our project is clean, now it has been improved to very clean'*

The discussions were fully audio-recorded and then fully transcribed to facilitate the analysis and to find the important findings from the discussions.

In addition, the discussions in these case studies were also intended as contributions to the validation of the CECM; therefore the researcher also directed the discussion to get feedback from participants about the CECM itself, and its effectiveness. Any confusion regarding the indicators or terminologies used in the CECM was noted by the researcher as feedback to refine the model.

7.3.3 Data Analysis in the Case Studies

Data analysis covers quantitative analysis to analyse data from questionnaire and qualitative analysis to analyse data from the discussions. The findings of qualitative data analysis are intended to provide deeper explanations of the findings from quantitative data analysis as well as feedback about the CECM from the construction professionals' point of view. Figure 7-2 presents the whole process of data analysis adopted with the case studies.

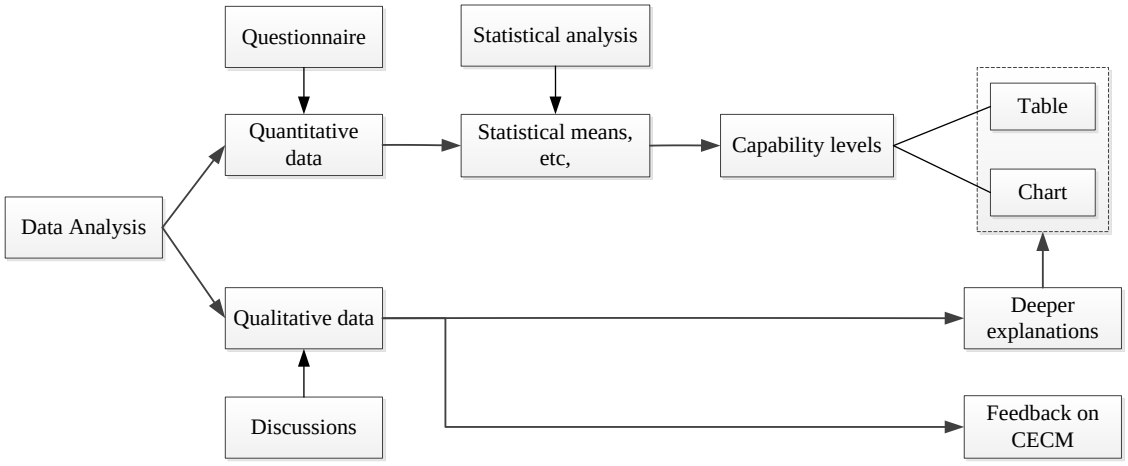


Figure 7-2 Data analysis in the case studies

7.3.3.1 Quantitative data analysis

The quantitative data was gathered from the questionnaires. The instrument covers 21 covers questions that represent 21 indicators of CE. Each question has four choices of answer that represent four capability levels. The quantitative data was analysed using statistical mean which is the arithmetic average of all numbers in a set of data. In this condition of data, the mean will range between a minimum of 1 and a maximum of 4 that represent the lowest level 1 and the highest level 4.

In this study, arithmetic mean is used to determine the capability level of contractor in three different issues as follows:

1. Mean of indicator to show the capability level of contractors to implement each of

21 indicator of CE. This mean is the arithmetic average of all data of each indicator.

2. Mean of group of indicators to show the capability level of contractors to implement each of the five dimension of CE. This mean is the arithmetic average of all data of the indicators that are grouped in every dimension.

3. Mean of all indicators to shows the capability level of contractors to implement CE thoroughly. This mean is the arithmetic average of all data from the 21 indicators

To provide a clearer picture of the results, mean of each indicator and mean of each dimension are plotted in two different radar diagrams.

Further statistical analyses were done to confirm that the means found in the analysis represented the real condition of the company. The measurements that have been done in addition to mean are standard deviation, outlier, and range of value.

1. Standard Deviation

Standard Deviation (SD) is used to measure the spread of data about the mean. A smaller SD means narrower spread of data about the mean and it shows that the respondents have relatively uniform opinions about the condition of their company.

2. Outlier

Usually an outlier is defined as value that is far outside other values in a set of data. An outlier can be far lower or far higher than other values. In this case study the values are limited to 1, 2, 3 and 4 only, therefore the outliers are considered as any values that lie outside the majority values that have been chosen by the respondents. The proportion of outliers were calculated to show how uniform is the opinion of respondents. Smaller proportions of outliers show more uniform opinions of the respondents was collected.

3. Range

Range is the difference between minimum and maximum values in a set of data. The smaller range shows more uniform opinions of the respondents. In this case study the maximum range is 3 because the minimum value is 1 and the maximum value is 4.

It means the range is quite small, therefore in this study the range demonstrates that there is no indicator that is rated at the lowest level and highest levels by the different respondents.

7.3.3.2 Qualitative data analysis

The capability levels that are presented based on the results of quantitative analysis, will be accompanied by a deeper overview about the implementation of CE in every participating contractor. In order to explain specific issues related to the implementation of CE in every participating contractor, a qualitative approach was adopted.

The qualitative data in the three case studies was collected through discussions with the participants. The discussions were fully audio-recorded and then fully transcribed in order to facilitate the qualitative analysis. The qualitative analysis was done by reading the discussion transcripts carefully two times. The discussion transcripts were read thoroughly for each discussion. After the main ideas from each discussion were captured, the discussion transcripts were re-read, while the important points that emerged from the discussions were noted.

Discussions in this case study also intended to gather feedback from construction professionals on CECM; therefore, when reading the discussion transcript and making a note of important issues, the findings that were related to the CECM's validation were also identified.

7.4 CASE STUDY 1

7.4.1 Background of Contractor 1

Contractor 1 started out as a privately owned company which began as a general contractor in 1970. Eventually this contractor has been recognised as a building construction specialist. For almost half a century the contractor has successfully maintained and even grown the business, sometimes rapidly; the company is now considered as a leading Indonesian building contractor.

Since 2006 this contractor has become a public company through a listing on the Jakarta Stock Exchange. On average this contractor obtained thirty five projects every

year. Nowadays the business employs over 1,100 staff members including around 400 professionals at the level of engineer. In 2014 this contractor set a target of achievement of IDR5.5 trillion (more or less equal to GBP290 million); by July 2014 this target had reached approximately 76%.

7.4.2 Profile of Respondents from Contractor 1

Thirteen respondents from contractor 1 participated in the case study. They are from different position levels ranging from director, manager, to engineer. Detailed profile of the respondents from this company can be seen in Table 7-1.

Table 7-1 Profile of respondents from contractor 1

No	Current Position	Education	Working Experiences	
			Construction	This Company
1	Director	Master	32 years	23 years
2	Commercial Manager	Bachelor	28 years	11 years
3	Commercial Manager	Bachelor	28 years	11 years
4	Quality Assurance Manager	Bachelor	20 years	2 years
5	Head of Department	Bachelor	14 years	14 years
6	Head of Department	Master	24 years	11 years
7	Project Manager	Master	20 years	20 years
8	Project Manager	Master	21 years	14 years
9	Project Manager	Master	14 years	10 years
10	Site Manager	Bachelor	20 years	1 years
11	Site Engineer	Bachelor	9 years	9 years
12	Site Engineer	Bachelor	10 years	4 years
13	Construction Engineer	Bachelor	7 years	6 years

7.4.3 Case Study 1 Analyses and Results

Table 7-2 shows the distribution of data from contractor 1 and the result of data analysis that covers outliers, range, mean and standard deviation. To give a better picture about the result, mean of indicators are plotted in radar diagram in Figure 7-3,

then means of group of indicators are plotted in radar diagram in Figure 7-4. The analysis shows, as a whole, contractor 1 is at level between 3 and 4 with mean 3.21. The highest level is reached by innovativeness while at the lowest level is risk taking.

This finding is in accordance with the real condition of this contractor. Programmes that support the creation of innovation have been seriously carried out by this contractor, for example this contractor has a programme called 'innovation day'. However this contractor does not really care about risk taking for getting projects because the majority of projects that come to this contractor are repeat order projects. The further discussion about each indicator is presented in the following sections.

1. Autonomy

Autonomy to access information in this contractor has achieved the highest capability level. It means this indicator has been standardized and continuously improved. Several online systems are provided to support staff to access information. This contractor set up the system named ESS (Employ Self Service) that is aimed to support personal uses of the employees to access information such as salary, bonus, holiday, etc. There is another system named RPAPP (Plan of Work Implementation and Budget of Work Implementation) that provides specific data for projects, such as project progress and project record.

Open communication within the company has been encouraged by this contractor. The 'doors' of managers and directors are always open to staff, so supporting the philosophy of open vertical communication. The contractor prepares the staff members to build a good communication among themselves, through programmes such as team building training. In addition, information technology is used to support both horizontal and vertical communication, such as e-mail, blackberry messenger, etc. Even though several efforts have been done to support communication, the capability level of this contractor for this indicator has not achieved the high level.

Table 7-2 Data analysis for case study 1

		INDICATOR																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
RESPONDENTS	1	3	3	3	4	4	4	4	4	3	3	3	4	3	3	3	4	3	2	3	2	3
	2	4	3	3	3	3	4	3	3	3	4	4	3	3	4	4	4	4	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	4	4	3	3	4	4	4	4	3	1	2	2
	4	3	3	3	3	3	4	3	3	3	4	3	4	3	4	4	3	4	3	3	2	2
	5	4	3	2	3	3	3	3	3	3	3	3	3	3	4	3	4	3	2	2	2	4
	6	4	4	4	4	4	4	4	4	3	3	4	4	3	2	4	3	3	3	2	1	4
	7	4	3	3	3	3	3	3	3	3	3	4	4	3	3	4	4	4	3	3	3	4
	8	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	4
	9	3	3	3	3	3	3	3	3	3	4	4	4	3	4	4	4	3	2	2	2	2
	10	4	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	1	4
	11	3	3	4	3	3	3	3	4	4	4	3	3	3	3	3	4	4	3	1	1	2
	12	4	2	3	3	3	4	4	4	4	4	2	2	4	4	4	2	2	4	2	2	2
	13	2	2	2	4	3	2	3	3	3	4	4	4	3	2	3	2	2	2	2	2	2
Outlier & %		1	1	2	0	0	1	0	0	0	0	1	1	0	2	0	2	2	2	2	2	1
		7.7	7.7	15.4	0.0	0.0	7.7	0.0	0.0	0.0	0.0	7.7	7.7	0.0	15.4	0.0	15.4	15.4	15.4	15.4	15.4	7.7
Range		2	2	2	1	1	2	1	1	1	1	2	2	1	2	1	2	2	2	2	2	2
Mean & SD		3.5	2.9	3.1	3.3	3.3	3.5	3.4	3.5	3.3	3.7	3.5	3.5	3.2	3.5	3.7	3.5	3.3	2.8	2.2	1.9	2.8
		0.7	0.5	0.6	0.5	0.5	0.7	0.5	0.5	0.5	0.5	0.7	0.7	0.4	0.8	0.5	0.8	0.8	0.7	0.7	0.6	1.0
Mean of Group		Autonomy				Competitive Aggressiveness					Innovativeness			Proactiveness				Risk Taking				
		3.2				3.4					3.6			3.5				2.6				
Mean of Overall		3.21																				

Outliers

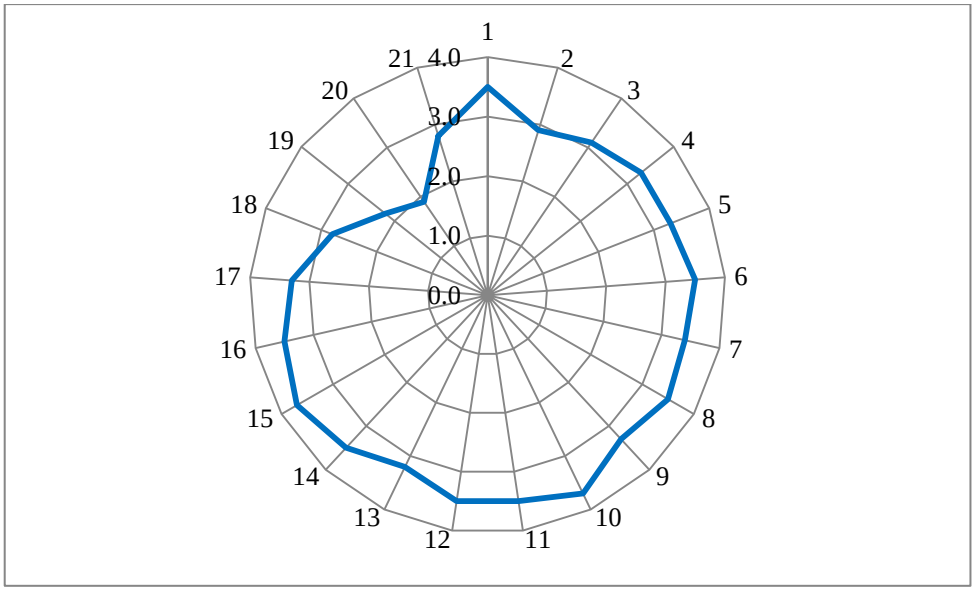


Figure 7-3 Capability level of each indicator of contractor 1

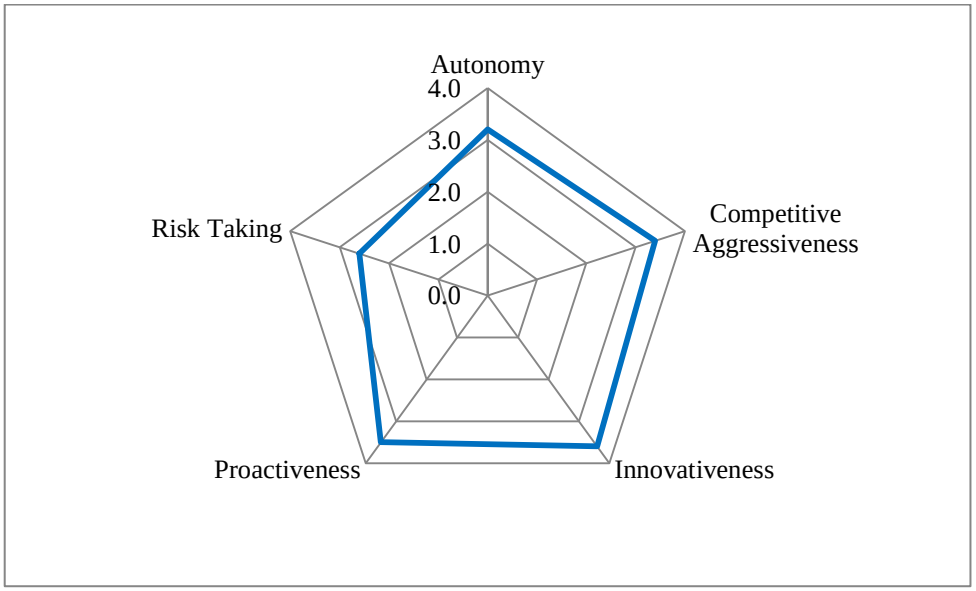


Figure 7-4 Capability level of group of indicators of contractor 1

The opportunity has been given to the staff members to propose suggestions that benefit the projects and the company; for example the staff members are required to propose improvements for updating the content of Quality System Procedure based on their experiences in the project site. In fact not all staff members have taken this opportunity.

The project team, especially the project manager as a leader, has the authority to plan and manage a project. Project manager and project team have authority to make a decision that is related to their project. But this authority is not unlimited, in some cases they need to consult with a related company director. For example, authority for purchasing is limited by budget, purchasing over a certain budget amount needs to be discussed with relevant director.

2. Competitive Aggressiveness

The corporate culture strongly supports the competitive aggressiveness of this contractor. In its corporate culture, this contractor declares some commitments such as: 'committed to quality and excellence', 'committed to customer', 'doing ordinary things extraordinarily', 'trustworthy and reliable', 'fair towards everyone' and 'committed to promises'

The contractor cares about a clients' problem and always tries to solve it. Clients are helped in a wide range of issues such as legal, financial, technical, social, etc. There are several cases of clients' problems that have been solved by this contractor, such as administering project licencing from government agencies, overcoming problems with the community about the project, finding alternative sources of funds for clients who have a payment problem. This particular contractor has even a department of project development to help clients with project design and planning. Because of these services, this contractor has been dubbed as a contractor that makes sure clients can sleep well.

Service to clients is one of the advantages that distinguish this contractor from the competitors. The company commits to provide a lifetime warranty for the clients. It means anytime the clients have a problem in their project they can ask this contractor to fix it. Maintaining a clean project site is another commitment of this contractor to the client; a new division that deals with this issued have been developed. This contractor realizes that every new excellent programme or initiative is always copied by its competitors; therefore the contractor always looking for new breakthroughs in order to maintain its lead over the competitors.

Client confidence in this contractor's trustworthiness and reliability can be evidenced by repeat orders from their existing clients. Almost 90% of the projects are in the 'repeat order' category. New clients approach the company because of recommendations from their existing clients. To maintain this trustworthiness, every

year the CEOs of this contractor arrange a general meeting with all staff members to remind them about their company's vision and mission. This contractor is also fully committed to completing the project regardless of any risks that must be borne and never cuts corners in the completion of projects.

Good relationship with clients has been maintained by this contractor. This responsibility is one of the duties of the marketing department; therefore the marketing department is not only assigned to locate new projects but also to maintain good relationship with established clients.

This contractor is positioning itself in the market that concerned with quality rather than cost. The contractor does not wish to get involved in market competition through price wars. Adhering to this principle this contractor can survive even growing its business in its chosen market. Existing clients are always loyal and many new clients are coming to it.

3. Innovativeness

This contractor can be considered as contractor which is advanced in innovation therefore among all CE's indicators, innovativeness reaches the highest level. Several efforts have been made by this contractor to encourage innovation. Every project is required to create innovations that are derived from the opportunities that are found in the project. Each project is not only required to create a single innovation but a number of innovations which are determined by the value of the project. Furthermore these innovations will be tested in other projects. If the result is shown to be applicable, then this innovation will be designated as a new standard that is applied to all projects.

This contractor arranges biannual programme named 'innovation day'. In this event all the innovations that were proposed by the various project teams will compete and the winning team will be rewarded and receive incentives. The innovations that have taken into account range from the simplest to high impact. This contractor starts to develop business process map until the year 2025 and innovation teams are a part of the map. The final target of this contractor is creating corporate innovations from project innovations.

Contractor 1 actively provides training for staff members; even during the last few years the budget for educational and training programmes has been increased. The

company also actively brings in the experts and experienced engineers to share their knowledge with staff members. This initiative is based on the belief that through education and training the quality of staff members will increase and the qualified staff members are assets of the company to develop yet more innovations.

4. Proactiveness

Proactiveness reached the second highest capability level for this contractor. The marketing department is considered as a 'spearhead' of this contractor in its efforts to get more projects. The current condition indicates that marketing is not an important issue for this contractor because it has abundant projects; even some projects being rejected because the contractor is already overloaded. Actually the marketing department is still considered as an important department by this contractor. The department has a main duty of maintaining good relations with existing clients, as well as looking for projects from new clients. Finding new market in new areas remains a target of this contractor to develop its business.

This contractor declares that being 'adaptive to the changing world' and 'future-oriented' is a part of its corporate culture. It maintained that it always looks ahead to the construction industry's future demands to keep its competitive advantage. This contractor is seen as the contractor that brings international standards to Indonesia's construction industry. In 1997 this contractor received ISO 9001, followed by other ISO and OSHAS certificates. The international standard of this contractor has been recognized by Superbrands in 2003. In dealing with the dynamics of the demands and developments of the construction industry, at the moment this contractor is committed to implementing green construction concept to its projects. More than just an implementer of green construction concept, this contractor actively involves as a corporate founder of Green Building Council of Indonesia (GBCI).

Business diversification is also a concern of this contractor in its efforts to sustain the business. New business opportunities that are related to its main business in the field of contracting are being actively explored. The contractor already has a subsidiary in property development as a business diversification effort. In addition, this contractor has also established another subsidiary that is engaged in the implementation of project in industry and infrastructure; with a special focus on the ability to provide a multi-disciplinary project management service. This contractor realizes that establishing

and then running a new business is not easy and can be challenging, especially when it doesn't have enough experience in that area of business.

5. Risk Taking

The weakest capability of this contractor in term of CE is in risk taking, however the highest level for risk taking was reached in 'risk taking for innovation'. This achievement is in accordance with the achievement in the indicator of innovativeness. On the other hand, low level of three indicators of risk taking that are related to projects are also consistent with the current condition of this contractor. At the moment, clients mostly come to this contractor to provide the projects, to the extent that some clients are declined because this contractor has been overloaded and has no more capacity.

This contractor develops innovations not instantly but through a long and careful process, as discussed previously. Several considerations such as cost, workability, future prospects have been carefully taken into account before the innovations were accepted and implemented. Furthermore, if the innovation has been tested and considered worthy, then these innovations can be used as a corporate standard to be applied in all relevant projects. In these circumstances, this contractor takes a bold risk taking action to embrace innovation.

The company gives the priority to do the projects from existing clients but it does not mean that getting projects from new clients is not important. About 90% of the projects of this contractor are repeated order projects from existing clients, but this enviable condition does not make this contractor feel complacent. Efforts are made to find projects from new clients, even though it is realized that new clients present higher risk: the known is less risky than the unknown.

The capability levels of this contractor for 'risk taking on project's financial, social and technical aspects' are quite low. This contractor is one of leading building contractors in Indonesia; therefore it was not struggle to obtain a project. In this situation, taking a risk to obtain a project does not become its concern. However, this contractor has a lot of experiences handling projects with an element of risk. At the time when the decision to take a risky project was made, the contractor was sure that the problems could be overcome.

Projects with financial problem could be overcome well. This contractor has a good relationship with financial institution such as bank that can help to solve the financial problems of their clients. The company's financial condition is also strong, enabling it to help clients that have financial problems.

At one time this contractor had worked on a project that had problems with the project's neighbourhood and the problem was successfully handled until the project was completed. At the time when the decision to take this project was made, the contractor was sure that it had a capable project manager who could be trusted to overcome the problem.

Technical risk is not a big problem for this contractor. It has a standard of procedure for evaluating technical aspects of every project. Every project that comes in will be reviewed in every technical aspect such as architectural, structural, mechanical and electrical, etc. therefore technical risk can be easily identified and anticipative actions can be taken.

7.5 CASE STUDY 2

7.5.1 Background of Contractor 2

Contractor 2 was established in 1961 as a state owned contractor in Indonesia. Initially this contractor was involved in projects that related to water such as land reclamation, dredging, harbours and irrigation. In 1973 the company expanded their scope of work to become a general contractor engaged in wider range of construction projects including highways, bridges, ports, airports and buildings.

Currently, this contractor is one of the market leaders in Indonesia's construction industry. In running the business, this contractor is supported by 1077 staff members; which 817 are engineers. The income of this contractor has grown rapidly and the revenue has increased significantly. The revenues of this contractor increased from IDR 8,808.42 billion in 2012 to IDR 9,686.61 billion in 2013. Since 2012, this contractor's shares have been listed on the Indonesian Stock Exchange (IDX). In term of number of projects, in 2013 this contractor commenced the construction of 34 big projects at a value of respectively above IDR100 billion

In running its activities, this contractor has 1 head-office in Jakarta supported by 30 branch offices. This contractor has expanded its market to reach overseas segments; in 2006 overseas branch-offices were opened in Dubai, and Jeddah. In 2000 this contractor gained its ISO 9001 certificate, which was then followed by other certificates such as ISO 14001 and OHSAS 18001. Expansion have also been carried out in a variety of new business areas such as precast, realty, energy and toll roads.

7.5.2 Profile of Respondents from Contractor 2

Thirteen respondents from contractor 2 participated in this case study. They are from different levels, from general manager to staff who work in head office, also project managers and site managers who works in project site. Profile of the respondents from this contractor can be seen in Table 7-3.

Table 7-3Profile of respondents from contractor 2

No	Current Position	Education	Working Experiences	
			Construction	This Company
1	General Manager	Master	26 years	26 years
2	General Manager	Master	21 years	21 years
3	Head of Division	Master	25 years	25 years
4	Head of Division	Master	25 years	25 years
5	Head of Division	Master	21 years	21 years
6	Head of Division	Bachelor	19 years	19 years
7	Head of Division	Master	20 years	2 years
8	Head of Division	Master	7 years	7 years
9	Expert Staff	Master	25 years	25 years
10	Expert Staff	Bachelor	21 years	21 years
11	Project Manager	Bachelor	23 years	23 years
12	Project Manager	Bachelor	14 years	12 years
13	Site Manager	Bachelor	11 years	3 years

7.5.3 Case Study 2 Analyses and Results

Table 7-4 shows the distribution of data and the result of data analysis for contractor 2. As has been done in the previous case study, mean of each indicator and each group of indicators are plotted in radar diagrams to give a better picture of the result. These radar diagrams can be seen in Figure 7-5 and Figure 7-6.

Among all indicators, at the highest level is proactiveness while at the lowest level is risk taking. This result is in accordance with the robust programmes of this contractor that supporting its proactiveness. For example this contractor has 30 branch offices that are spread all over Indonesia and 2 overseas branch offices in order to expand its market both locally and globally. Another proactive example is the business diversification that has been done by this contractor, at the moment it has run several construction-related businesses, such as property developer, pre-cast concrete fabricator, and hydro power plants.

1. Autonomy

Autonomy covers four indicators of CE, for all of these indicators, the capability level of this contractor is quite uniform. The staff members of this contractor have the autonomy to access information freely, but certainly their tasks and positions are considered. To support this autonomy, this contractor has set up an online system to access the data but currently this system is not been fully ready. A new IT system named Enterprise Resource Planning (ERP) has been developed to improve the company's existing IT system. Through ERP all necessary information related to both office and project can be easily accessed.

This contractor declares that 'communication' is a part of its corporate culture, therefore the corporate climate supports the establishment of open communication. Oral and written, as well as formal and informal, communication has been going well. Along with technological advancements, electronic communication via e mail, messenger, etc. has been evolved throughout this company. Superiors always provide an opportunity for staff members to communicate through various means. However, autonomy for communication is still informed by the hierarchy within the company.

Table 7-4 Data analysis for case study 2

		INDICATOR																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
RESPONDENTS	1	3	3	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2
	2	4	4	3	4	4	3	4	4	2	3	4	4	4	4	4	4	3	3	3	2	2
	3	3	2	3	3	2	4	4	3	3	4	3	3	3	4	3	3	4	3	2	2	2
	4	4	4	4	3	4	4	4	4	3	3	4	3	4	4	4	4	4	3	3	4	4
	5	3	3	3	3	4	4	3	3	3	3	3	2	3	4	3	4	4	3	3	3	4
	6	3	2	3	3	3	4	3	3	2	3	4	3	3	3	3	3	3	3	3	4	4
	7	2	3	2	3	3	2	4	2	2	2	2	2	4	3	4	4	2	2	3	3	3
	8	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	2	4
	9	3	3	3	4	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3	4	4
	10	3	3	2	3	3	3	3	3	3	3	4	3	2	3	3	3	4	4	2	2	3
	11	4	3	4	4	4	3	3	3	3	4	4	4	4	4	4	4	4	4	2	4	4
	12	3	3	3	3	2	4	3	3	3	4	4	3	4	4	4	4	3	3	2	2	2
	13	2	3	3	2	3	3	3	2	2	2	2	3	3	4	4	3	3	2	2	4	2
Outlier & %		2	2	2	1	2	1	0	2	2	2	2	2	1	0	0	0	2	2	2	2	2
		15.4	15.4	15.4	7.7	15.4	7.7	0	15.4	15.4	15.4	15.4	15.4	7.7	0	0	0	15.4	15.4	0	15.4	15.4
Range		2	2	2	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2	2
Mean & SD		3.2	3.1	3.1	3.3	3.2	3.5	3.5	3.2	2.8	3.2	3.4	3.2	3.5	3.7	3.6	3.6	3.4	3.2	2.8	2.9	3.1
		0.7	0.6	0.6	0.6	0.7	0.7	0.5	0.7	0.7	0.7	0.8	0.7	0.7	0.5	0.5	0.5	0.8	0.7	0.7	1.0	1.0
Mean of Group		Autonomy				Competitive Aggressiveness					Innovativeness			Proactiveness				Risk Taking				
		3.2				3.2					3.3			3.6				3.1				
Mean of Overall		3.25																				

Outliers

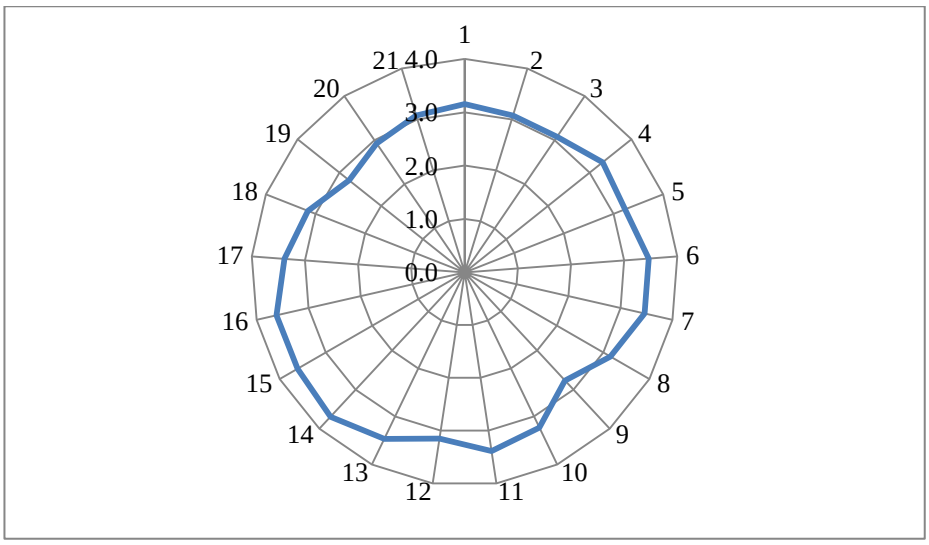


Figure 7-5 Capability level of each indicator of contractor 2

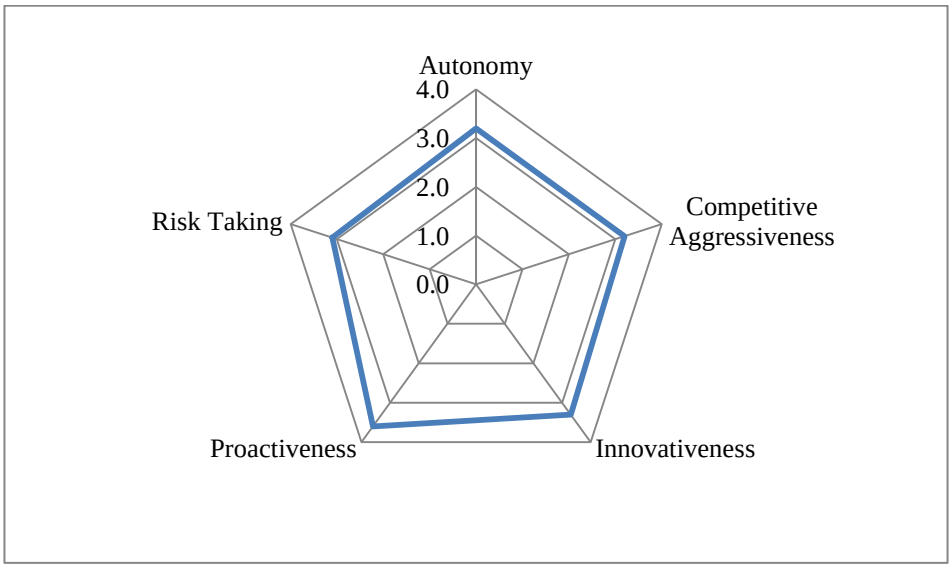


Figure 7-6 Capability level of group of indicators of contractor 2

Autonomy for the staff members to propose suggestions has been going well even this contractor declared that 'openness' is a part of its corporate culture. Opportunity to propose suggestions has been built since the staff members started working for this contractor. Six months after they attend inductive job training, new staff members are asked to make a presentation about their suggestions for improving the systems that they have learned during the training. The opportunity to propose suggestions can be done by any staff member at any time through any forum.

This contractor gives autonomy to project team to plan and manage their projects because it is realized that the main income of a project based firm comes from

the projects it obtains. The autonomy covers determining construction methods as well as the appointment of suppliers and sub-contractors. However, for the decisions that are associated with a substantial amount of funding, the project team needs to discuss the issues with top management before a decision can be reached

2. Competitive Aggressiveness

This contractor cares about clients' problems and always tries to solve them. Synergy with customers is one of this contractor's missions. In collaboration with the client, this contractor tries to optimize a project's cost, time and quality. For example by using value engineering this contractor helps clients to find the best way to reduce project cost without sacrificing its duration and quality.

Being different compared to their competitors has been become an important issue for this contractor. During the interview, one of the general managers mentioned that his department has a principle 'to be better must be different'. This contractor also has several advantages compared to its competitors, such as experience in working on airport projects, having patented of construction method.

This contractor declares 'integrity' as part of its corporate culture; they are committed to being guided by strong moral principles to run the business. Integrity is an important aspect to build client trustworthiness. This contractor also builds client confidence through its reliability. Experiences gained whilst building several featured, excellent and high quality projects are the evidence of this contractor's reliability. This evidence is supported by various awards from domestic and foreign institutions that have been received by this contractor.

As a state owned contractor, this contractor has a lot of experience to build public projects; therefore maintaining good relationship with public sector clients cannot be implemented because public projects should use open tender system and repeated order to the same contractor without tender process is totally prohibited. However this indicator is one of two indicators that is in the highest capability level. This finding may be correlated to the current development of this contractor which has expanded its market to include private projects. Its corporate policy mentioned potential civil work from private sector is its focus. In line with this development, this contractor is concerned about maintaining good relationship with clients in order to catch the opportunity to get repeated order from previous and existing clients.

Among indicators of competitive aggressiveness, the indicator 'positioning on markets that are concerned about quality' is in the lowest level even though it is not at the really low level. This condition may be related to their experiences working for public clients who usually are not as demanding about project quality as are its private clients.

3. Innovativeness

This contractor reaches high capability levels for the indicators of innovativeness. This contractor is committed to increase the budget for human resource training because this programme can improve the capacity and capability of human resources. A qualified and capable human resource pool is an important factor to encourage innovation.

Another effort to encourage innovation is an opportunity for staff to get a bonus. This contractor has a policy to share the additional profit from the project to the project team if the profit from the project exceeds its targeted profit. This policy encourages project team to implement innovative works in the project. This contractor also holds programmes of innovation competition among staff members.

A lot of efforts have been made to encourage innovation but all activities that related to innovation have not been carried out regularly and evaluated properly. However, this contractor has produced a patent for construction method.

4. Proactiveness

This contractor implements a decentralized marketing system. Since this contractor was reorganized, it was divides into several divisions based on the type of work and geographic area concerned. Each division has authorization to conduct its activities from marketing to production. Thereby the contractor has a network to get more extensive information about the availability of projects both in and outside the country. Currently this contractor has 30 branch offices that spread all over Indonesia and 2 overseas branch offices. One overseas office is in Dubai that covers United-Emirate Arab area and one is in Jeddah that covers the Kingdom of Saudi Arabia.

This contractor looks ahead to the construction industry's future demands in an attempt to maintain its competitive advantage. Implementation of international quality standards such as ISO 14001: 2004 for Environmental Management System, OHSAS

18001: 2007 for Occupational Health and Safety, ISO 9001: 2008 for Quality Management System, and Certificate Security Management System Audit represent this contractor's efforts to meet the demands of the construction industry that evolve from time by time. Currently this contractor is implementing a business strategy to develop new products, based on the concept of green construction to meet the latest demands of construction industry.

Business diversification gets special attention from this contractor. Initially it was triggered by the Indonesian government's policy on asset optimization for state owned companies in general. This contractor has a lot of properties such as: buildings, lands and equipment. that have not been used optimally to raise funds. Starting from this condition, various programmes and strategic plans have been commenced in 2013 but it was agreed that the focus remains on the business sectors that are related to the core business. At the moment, this contractor has run several new businesses such as property developer, pre-cast concrete manufacturer and hydro power plants.

5. Risk Taking

The highest capability level of risk taking's indicator is 'risk taking for innovation'; it is in accordance with the achievement of this contractor for innovation as discussed earlier. Risk taking for selecting new clients also at level higher than 3 because this contractor declares that expanding to new construction market is one of its corporate strategies. Risk taking on technical aspects of a project is also at a level higher than 3, because with this contractor has enough resources to handle technical problems, therefore it is not a big problem for this particular company.

This contractor is at level lower than 3 for risk taking on financial and social aspects. This condition is related to the status of this contractor as being state owned and which therefore has more experience working for public projects with less financial and social risks than for private projects.

In order to support the implementation of risk taking behaviour, this contractor includes risk management as one of corporate business strategy for year 2013 to 2015. It indicates that this contractor is considering risk taking is an important issue but any risk needs to be managed properly.

7.6 CASE STUDY 3

7.6.1 Background of Contractor 3

Contractor 3 is a privately owned company which was established in 1984. Start from the beginning, this contractor has focused on building projects. A lot of experience of this contractor has been in constructing building projects such as apartments, hotels, factories, shopping malls.

Along its journey, this contractor has been growing rapidly and has become one of the leading building contractors in Indonesia. At the moment this contractor has one head-office in Jakarta and three branch-offices in three major cities in Indonesia. This contractor has successfully maintained its business sustainability. Several large or even mega projects in Indonesia were built by the company in 2014 such as: 4 apartment and residence projects, 6 hotel projects, 1 factory and warehouse project, 1 office project and 1 religious facility project. Among these projects, some of them are multiyear projects that will be continued until 2017.

7.6.2 Profile of Respondents from Contractor 3

Eight respondents from contractor 3 have been participated in this case study. They are from different levels, from director, manager to lower level staff, but most of them are people who work at the project site. A detailed profile of the respondents from this contractor can be seen in Table 7-5.

7.6.3 Case Study 3 Analyses and Results

Table 7-6 shows the distribution of data and the result of data analysis for contractor 3. As has been done to the previous case studies, means of each indicator are plotted in radar diagram Figure 7-7 then means of groups of indicators are plotted in radar diagram in Figure 7-8 to give a better picture about the capability level of contractor 3.

The analysis shows that for contractor 3, the highest level is reached by competitive aggressiveness, while at the lowest level is risk taking. The results of data

analysis together with specific conditions that related to the implementation of CE in this contractor will be discussed further in this section.

Table 7-5 Profile of respondents from contractor 3

No	Current Position	Education	Working Experiences	
			Construction	This Company
1	Director	Bachelor	32 years	28 years
2	QA & QC Manager	Master	15 years	12 years
3	Project Manager	Bachelor	17 years	11 years
4	Project Manager	Bachelor	25 years	10 years
5	Site Manager	Bachelor	16 years	9 years
6	ME Coordinator	Bachelor	25 years	11 years
7	Quantity Surveyor	Bachelor	18 years	8 years
8	Quantity Surveyor	Bachelor	2 years	2 years

1. Autonomy

All indicators of autonomy have means that are evenly distributed around 3.4. Sharing information and formal communication are done in this contractor through formal meeting such as regular monthly meeting and management review meeting. This contractor gives flexibility to the staff members to access information but this autonomy is regulated based on the position of the staff members. The autonomy to access information and data is almost unlimited to project manager up to the top level position.

This contractor implements hierarchical communications system. For example at project level, effective communication occurs between staff and supervisor, then supervisor and related chief officer, chief officer and project manager and finally project manager and director. Using this system, communication and data or information distribution appear to be going well. Informal communication also goes well because the company builds the culture that supporting an informal communication. For example when the project's status is urgent the project manager can discuss directly with the relevant director to find the best solution, even time is not a constraint for informal communication.

Table 7-6 Data analysis for case study 3

		INDICATOR																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
RESPONDENTS	1	4	4	3	4	4	3	4	4	4	2	4	3	4	3	4	4	4	4	3	3	3
	2	3	3	3	3	4	4	4	4	4	2	3	3	3	3	4	2	3	3	2	2	2
	3	4	4	4	4	2	4	4	4	4	2	4	4	3	4	4	3	4	4	2	2	2
	4	4	3	3	3	4	3	4	4	2	4	4	3	4	3	3	4	4	2	2	2	
	5	2	4	4	3	3	2	4	3	3	2	2	2	3	2	3	2	2	2	1	2	2
	6	3	4	3	3	4	3	4	4	4	3	3	4	4	3	4	3	3	4	2	3	2
	7	3	3	4	4	3	4	4	3	3	2	4	4	3	4	2	2	4	4	1	1	2
	8	4	3	4	4	4	4	3	3	4	3	4	3	3	3	3	2	4	3	1	3	2
Outlier & %		1	0	0	0	1	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1
		12.5	0.0	0.0	0.0	12.5	12.5	0.0	0.0	0.0	0.0	12.5	12.5	0.0	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Range		2	1	1	1	2	2	1	1	1	1	2	2	1	2	2	2	2	2	2	2	1
Mean & SD		3.4	3.5	3.5	3.5	3.4	3.5	3.8	3.6	3.8	2.3	3.5	3.4	3.3	3.3	3.4	2.6	3.5	3.5	1.8	2.3	2.1
		0.7	0.5	0.5	0.5	0.7	0.8	0.5	0.5	0.5	0.5	0.8	0.7	0.5	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.4
Mean of Group		Autonomy				Competitive Aggressiveness					Innovativeness			Proactiveness				Risk Taking				
		3.5				3.6					3.0			3.1				2.6				
Mean of Overall		3.17																				

Outliers

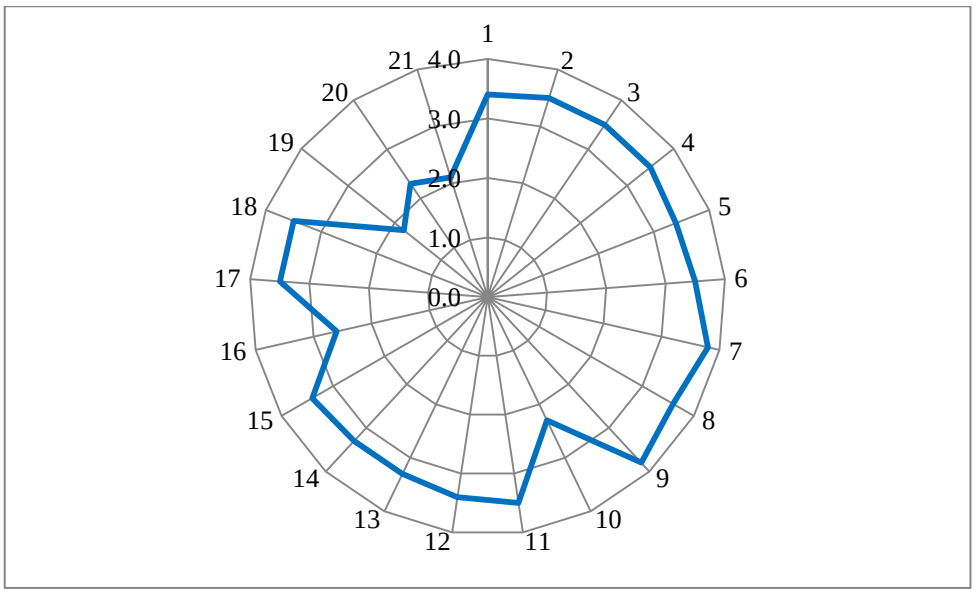


Figure 7-7 Capability level of each indicator of contractor 3

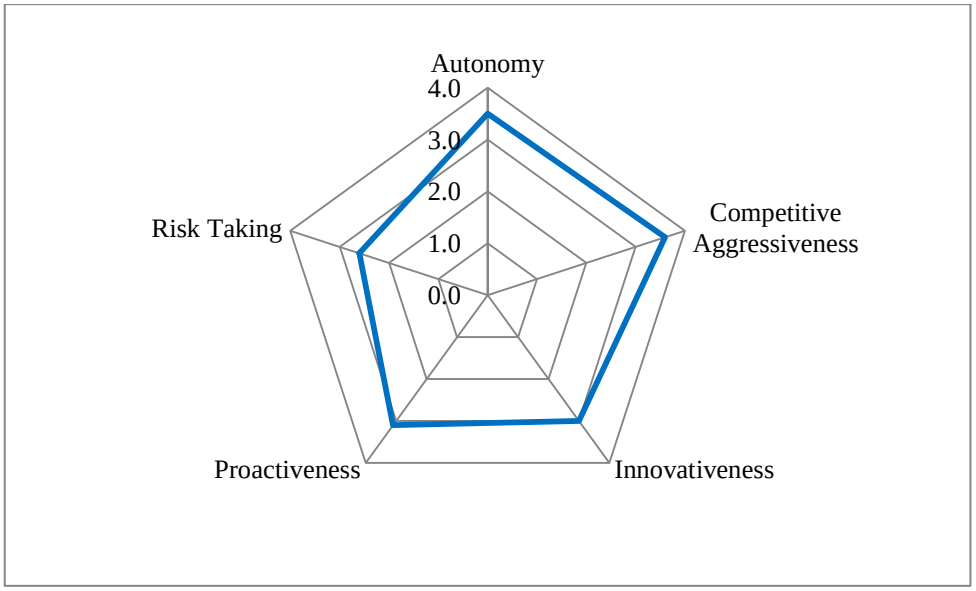


Figure 7-8 Capability level of group of indicators of contractor 3

Creative ideas from staff members are always accommodated, therefore some policies and standards of this contractor are developed based on staff members' ideas. This contractor also accommodates staff's needs; therefore some investments have been made based on the proposals from staff members. Autonomy is also given to the project team to plan and manage its particular project. For example, the project team has autonomy to determine the sub-contractor that will be used in the project.

2. Competitive Aggressiveness

The indicators at the highest level in competitive aggressiveness are ‘company’s trustworthiness and reliability’ and ‘positioning on markets that are concerned about quality’ In the lowest level there is ‘acting as problem solver for clients’ This contractor strives to help clients to solve their problems, especially technical problems, although in some cases this eventually leads to the issue of additional costs as well. For financial problem, this contractor usually gives flexibility in payment schedules if the client is in financial difficulties. The project will not be terminated suddenly after the client fails to pay on time but the schedule of payment is negotiable as far as it proves to be still acceptable to the company.

This contractor considered itself as the contractor with reliable working speed, never compromising on project quality and keeping a reasonable project cost. This concept is offered to the clients as the advantages of this contractor compared to its competitors. In some projects, the client does not use a consultant to supervise the project, because the client trusts that this contractor is trustworthy and reliable.

Good relationships with clients are maintained through the commitment of lifetime service. Whenever a client makes a complaint about the building, this contractor commits to provide a good service despite the building maintenance period has been ended.

Positioning on markets that are concerned about quality can be seen through the projects that were built and with those that are in progress. All of them are very prestigious projects in Indonesia with very high budgets. It shows that this contractor is putting itself at the top of the construction market. This contractor also mainly focuses on private sector projects.

3. Innovativeness

Among the indicators of innovativeness, there is a big gap between the lowest and the highest capability levels. At the lowest level with mean 2.3 is ‘carrying-out research and development activities’, while at the highest level with mean 3.5 is ‘challenging staff to be innovative’.

This contractor doesn’t have any specific programme for research and development activities. Innovations are expected to emerge from projects and staff

members who involved in both office and projects. Every year this contractor recognizes ‘project of the years and ‘project manager of the year’ and gives them awards and rewards to spur the emergence of yet more innovations. Due to this expectation therefore the development of staff members’ ability and knowledge become very important. This contractor provides and arranges trainings to develop the ability and knowledge of its staff members.

4. Proactiveness

This contractor has marketing division that is led by director of marketing. This division carries out various activities related to marketing and efforts to get the project. Various duties of this division include searching new clients, introducing the company to new potential clients, developing and maintaining company’s website, searching new projects, conducting joint operations with the other contractors.

Contractor 3 is concerned with expanding their market coverage into new areas. It is very active searching for opportunities in all areas of Indonesia; almost all regions in Indonesia have been explored. Now this contractor has three branch offices in three different cities of Indonesia to support its expansion to new areas of Indonesia.

Anticipation of the construction industry’s future demands is always on the agenda in this company. Several years ago this contractor anticipated the need for ISO Certification; this time they are making great efforts to meet the demand of ‘go green’ issues. This contractor attempts to use materials and to apply methods that are environmentally friendly. Other efforts, such as sending engineers to attend training workshops that related to 'green issues’, as well as attempting to obtain various ‘green’ certificates, are being made. In this situation, ‘looking ahead to future demands’ becomes the indicator at the highest capability level

This contractor just started to run new business outside of contracting. This contractor is now into the business of property development; it also owns and manages some hotels in some cities in Indonesia. This contractor has looked at some other potential business opportunities but they have not been started yet, for example business in construction equipment and pre-cast concrete fabrication. This contractor has invested a lot of money to buy heavy equipment but it is still limited only to serving its own projects. This contractor also has mass production of pre-cast concrete facility but

it is still limited to use in its projects. For this reasons, ‘running business diversification’ is the indicator at the lowest level for this contractor.

5. Risk Taking

In the similar condition to innovativeness, among the indicators of risk taking, there is a big gap between the lowest and the highest capability levels. ‘Risk taking on the financial aspects of projects’ is in the lowest capability level with mean only 1.8, while ‘risk taking for innovation’ and ‘risk taking for selecting clients’ are at the highest capability level with mean respectively 3.5.

This contractor develops innovation through the initiative of team projects and other staff members, not through research and development activities; therefore this contractor can be considered as one that takes bold action on innovation development. Nevertheless all proposals of innovation should be carefully evaluated before being applied.

In accepting a project from new clients, this contractor is bold enough to take a risk, but it needs to do a careful evaluation of the client's financial condition as well as institutions that supports the potential client. The example of boldness of this contractor in risk taking can be seen in accepting a project from a new client; that of a 65 floors building. The new client that not worked with this contractor before but the project was finished without any problems.

This contractor tends to avoid risks that come from the projects itself, such as financial risk, social risk and technical risk. In particular it is happening that when this contractor gets a lot of projects, some of them have been rejected because it has been overloaded. Demands for its service were way beyond its capacity. Nevertheless it does not mean this contractor will directly reject a project if some risks are found. This contractor is still trying to accept the risks the project brings, if ways to overcome those risks can be found. For example: inviting experts to solve technical problems, to approach the local community around a project to tackle social or environment problem.

7.7 THE DISCUSSION OF THE THREE CASE STUDIES

After investigating the results from the three case studies, several interesting findings that are considered important to validate the CECM were identified.

1. Among five dimensions of CE, risk taking is the dimension at the lowest level for all contractors in these case studies. This finding can be attributed to two issues. First contractor business is very high risk because the result of the failure can be commercially fatal such as bankruptcy; therefore contractors tend to be very careful about taking risks. Second the participants of these case studies are contractors that are well established in their businesses; they are the leading contractors in Indonesia therefore risk taking to get a project does not become their main concern.

2. Each contractor determines its own strategy to run the business; therefore each of them achieves the highest capability level in the different dimension. Contractor 1 has the highest capability level in innovativeness, contractor 2 has highest capability level in proactiveness and the highest capability level of contractor 3 is in competitive aggressiveness. The strategies that are implemented depend on the circumstances, aims and objectives of every contractor in running the business.

3. The capability level of contractor 3 to implement each indicator is least uniform compared to the other two contractors in these case studies; this can be seen clearly in radar diagram in Figure 7-7 which shows the outer line of the diagram is not smooth enough. It shows that the capability of the contractor to implement every indicator is unequal. This finding is correlated to the 'establishment statuses' of the contractors. Even though contractor 3 is an established contractor in Indonesia, compared to contractor 1 and contractor 2, contractor 3 is less well established.

7.8 EVIDENCES OF PRACTICAL APPLICABILITY OF THE CECM

After reviewing the case studies that have been carried out with three established contractors in Indonesia, several important issues that support the practical applicability of the CECM have been found. These findings can be considered as evidences to

support the practical applicability of the CECM for assessing the CE capability level of contractors. Figure 7-9 presents the overall evidence that supports the practical applicability of the CECM.

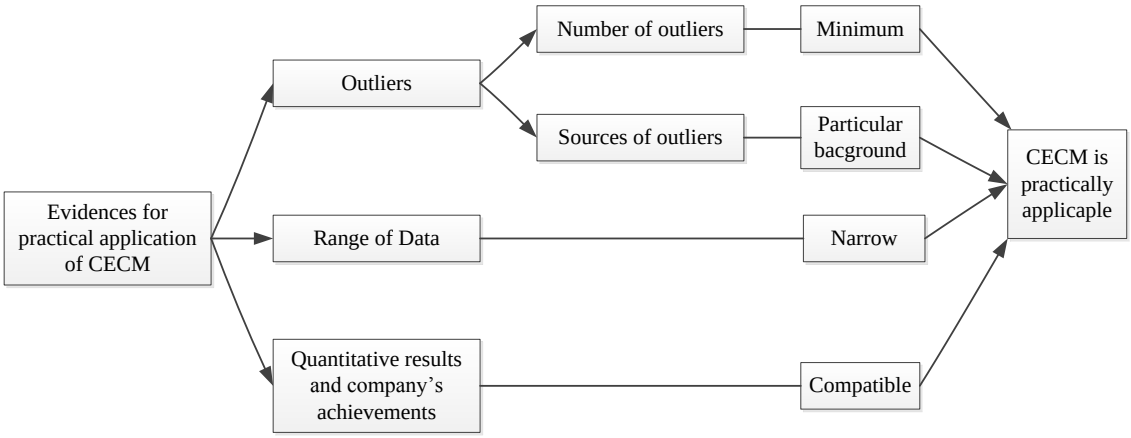


Figure 7-9 The evidences of CECM practical application

1. Evidence 1: number and source of outliers

The number of outliers or the values that lie outside the majority values is limited to only 2 data out of 13 data in case studies 1 and 2; and 1outlier data out of 8 data in case study 3. It means among all respondents from the same company, a maximum of only 15.4% of them have different opinions about the condition of their company.

The calculation of outlier percentage is shown in the following example. The capability levels for one indicator based on the assessment of 13 respondents are: 4, 4, 3, 4, 3, 4, 3, 4, 3, 4, 3, 4, 2. In this set of data, there is only 1 data out of 13 that can be considered as an outlier, that data is 2. It means only one respondent considered the company was at level 2, while the rest of respondents considered the company was at level 3 or level 4. In this example the percentage of outlier in this set of data is 7.7%.

After all data was investigated, it was found that the different opinions have come from the staff members with particular backgrounds. The background of respondents who were the majority of outliers in each case study is presented in Table 7-7.

Table 7-7 Contributors of majority of the outlier data

Case Study	Contributors of majority of the outlier data		Number of outliers contributed
	Position	Working experiences in this company	
1	Site Engineer	4 years	5
	Construction Engineer	6 years	6
2	Head of Division	2years	11
	Site Manager	3years	6
3	Site Manager	9years	6

The data in this table shows that the respondents contributing majority of outliers were the staff members who work in project site. Only one of them is working in the company's head office but with short working experience in the company. Therefore working experiences can be considered as another aspect that influences the opinions of staff about the condition of the company. The number and source of outlier data in these case studies shows that the model collects relatively uniform opinions from participants in the same company.

2. Evidence 2: Range of data

In addition, evidence that shows the model collects relatively uniform opinions from the participants from same company is 'range of data' or the difference between the smallest and the biggest data for one indicator in one case study. The range of data, excluding outliers, found in all indicators in all case studies is mostly only 1. The only exception was found in indicator 21 of case study 1, and indicators 20 and 21 of case study 2. It means the exceptions total only 3 out of 63 sets of data. However no indicator has been rated at two different extreme levels, which means that all respondents assessed every indicator at two successive levels.

3. Evidence 3: compatibility between quantitative results and interviews

The findings from the quantitative data analysis are corroborated the condition of the companies. For example, contractor 1 achieves the highest capability level for innovativeness, which is in accordance with the effort of this contractor to support the

creation of innovation. This contractor has biannual programme called 'innovation day' that is aimed to stimulate the creation of innovation. The overall findings that support this evidence are presented in every case study.

7.9 FINDINGS WITH RESPECT TO VALIDATION OF THE CECM

During the process of assessment in the case studies, findings with respect to the CECM's validation have been found from the discussion with participants. As explained earlier, the transcripts of discussions were read carefully two times, and then the important points that emerged from the discussions were noted.

Two significant inputs, that need to be considered to refine the CECM, have been noted. These inputs are

1. Some participants were confused with the assessment criteria for level 3 and level 4 of all indicators. The assessment criteria for each level before refinement were as follows:

    - Level 3: the implementation of indicator has been standardized
    - Level 4: the implementation of indicator is regularly evaluated and continuously improved.

    These two assessment criteria have been misinterpreted by some participants. They had thought that at level 4, the implementation of indicator is regularly evaluated and continuously improved but has not been standardized whereas the assessment criteria for level 4 also covers the assessment criteria for level 3 with addition of regularly evaluated and continuously improved.

    As a result, the assessment criteria for level 4 for all indicators have been changed to: 'the indicator has been standardized, regularly evaluated and continuously improved'

2. Some respondents were concerned about the indicators that are directed to repeat order such as: the 'maintaining relationships with clients', 'acting as a problem solver for clients' and 'building and maintaining client confidence in the company's trustworthiness and reliability'. They mentioned that these indicators should be

addressed wisely when a contractor makes a deal with a project from the public sector because the procurement of public sector projects should use a transparent open tender system in order to avoid fraudulent practice. However, for the projects from private clients, this indicator plays a very important role. This does not change the applicability of the CECM for these companies.

In addition to the input from participants as explained earlier, the researcher also found some important experiences when implementing this model for the case studies with the three contractors. These experiences raise the following issues that need to be considered when implementing the model.

1. During the assessment process, filling out the questionnaire should be accompanied with discussion between assessor and participant. Discussion will minimize any misunderstanding by the participants because, during discussion, the assessor can explained each question and each answer clearly as well as the participants have chance to clarify unclear items in the questionnaire, therefore the answer from respondents will not be biased. In addition, discussion also enriches the results of assessment.
2. In order to get an objective result, the participants must come from a variety positions within the company; however they should be a construction professional because they will have better understanding about both the company's operational activities, as well as its company's policies.
3. Interviews should be conducted separately, person to person, to avoid mutual influence among respondents who, if in a group or non-confidential situation may also fear to answer the questions honestly

7.10 SUMMARY

This chapter presented the case studies for implementing CECM. The aim of this case study is to assess the practical application of CECM. The case studies involved three big contractors in Indonesia; participants being asked to respond to questionnaires and face-to-face discussion. The staff members from different level in every contractor were asked to fill the questionnaire to assess the capability level of their company to implement CE. In addition, discussions with the participants were carried out to get more detailed information about the implementation of CE in their company. In addition, these case studies were also intended to gather the feedback from the

construction professionals on the ease of implementation of the CECM. Then based on their feedback the CECM was refined.

After reviewing the results of all case studies, it can be concluded that the CECM is practically applicable for assessing the capability of contractors to implement CE. This conclusion is based on findings from analysis of the case studies, such as the uniformity of the respondents' opinions when answering the questions in the questionnaire. It was also noted that the findings from the discussions corroborated the findings from the quantitative data analysis.

Chapter 8 - CONCLUSION AND RECOMMENDATIONS

8.1 INTRODUCTION

This chapter presents the achievements of this study, with respect to its aim and objectives that were declared at the beginning of this thesis. Furthermore, this chapter focuses on the contribution of this study to knowledge as well as the practical implications of this research. The limitations of this work are discussed and finally, several recommendations for further studies are presented in the last section of this chapter.

8.2 ACHIEVEMENT OF RESEARCH OBJECTIVES

This study was aimed at investigating and developing a model of CE for assessing the capability level of contractors, with specific focus on contractors in Indonesia. This aim was achieved through several specific research objectives:

1. to explore theoretical concepts and previous work on entrepreneurship with a specific focus on CE in construction and contractors,
2. to identify the key factors of CE for contractors,
3. to develop a CECM for assessing entrepreneurial orientation of contractors and their capabilities,
4. to validate the CECM through an expert review and case study.

The following section summarizes the findings of this study with respect to the original objectives of this study.

Objective 1: to explore theoretical concepts and previous work on entrepreneurship with a specific focus on CE in construction and contractors.

The literature review of the concept of entrepreneurship presented in Chapter 2 has defined entrepreneurship both at individual and organizational levels. Entrepreneurship at organizational level has been recognized as CE, while at individual level,

entrepreneurship can be differentiated into entrepreneur and intrapreneur. CE, as a focus of this study, was explored further in order to achieve a better understanding about CE and to examine the implementation of CE in construction.

This study adopted five dimensions of CE proposed by Lumpkin and Dess (1996) to explore CE: autonomy, competitive aggressiveness, innovativeness, proactiveness, and risk taking.

Considering the role of CE to support business success in several areas, it was expected that CE can be applied as a part of contractors' strategies in order to support the success of contractors' business, especially Indonesian contractors, with whom this study was conducted.

The literature review for CE in construction found there is very little discussion about CE in construction literature, and no research that addresses the five dimensions of CE together. Previous research efforts in construction management which focused on individual dimension of CE, have investigated the implementation of those dimensions with a view to improving competitive advantage in order to achieve sustainable growth.

In addition to examine the implementation of CE, this study found the importance of assessing the entrepreneurial orientation of a company in order to provide the foundation to develop an appropriate strategy to improve that company's business performance. The ways to measure CE, as presented in several studies have been explored and presented in Chapter 2. After reviewing all of these approaches, it was found that methods to measure CE have not been explored deeply because the existing studies were more focused on the relationship between CE and a company's performance.

Objective 2: to identify the key factors of CE for contractors,

After obtaining an overview of CE in construction through literature search, this study conducted research to investigate the implementation of CE by contractors, the results of the investigation are presented in Chapter 4. The data gathering was carried out by following the research methodology that was presented in Chapter 3.

Twenty one key factors were identified in order to provide a better understanding of CE for contractors. These 21 key factors can be classified into five dimensions of CE that

have been adopted in this study. These findings were explored through the experiences of contractors in Indonesia.

Further investigation found that these factors are related to each other. This finding showed the 21 key factors cannot be implemented individually because they are interrelated, one to another. Later the 21 key factors were used as the indicators of assessment model to estimate the capability of contractors to carry out entrepreneurial activities.

Objective 3: to develop a CECM for assessing entrepreneurial characteristics of contractors and their capabilities,

- **CECM**

  Chapter 5 presented the model designed to assess entrepreneurial orientation of contractors and their capabilities. The researcher named the model the Corporate Entrepreneurship Capability Model (CECM). This model was developed using the concept of CMM. 21 key factors of CE that have been identified in Chapter 4 are used as indicators to assess contractor's capability to implement corporate entrepreneurship. The contractor's capability in each indicator is measured based on four capability levels: initial, repeatable, managed, and optimized. Finally assessment criteria for each indicator at every level are defined. The model is presented in the form of a matrix which shows the assessment criteria for each level of the 21 indicators.

- **Assessment procedure**

  This study also developed a procedure to assess the entrepreneurial orientation of a company, using the CECM. Two versions of the procedure were developed: a procedure for self-assessment and a procedure for external purpose. In order to make the framework of the CECM applicable in the assessment process, this framework has been transposed into a questionnaire format. This questionnaire is ready to use to gather the opinions of people about the entrepreneurial characteristics of contractors. Finally bar-charts and radar diagrams present the final results in ways designed to be easy to understand.

Objective 4: to validate the CECM through an expert review and case study

In order to improve the quality of research findings, validation needs to be carried out. This study chose expert review to validate every single aspect of CECM and three case studies to assess its practical application.

- **Expert review**

  Ten academics with construction management practice, research and teaching background from several universities in Indonesia were chosen as experts to review the CECM. The review process was conducted through face-to-face focus group discussions and face-to-face individual interview. Several comments and inputs from experts have been used to improve and to refine the model. The CECM was accepted by ten experts as an appropriate framework to measure the entrepreneurial orientation of a contracting company by the experts. The expert review process and results were presented in Chapter 6.

- **Case studies**

  Three case studies were carried out in Indonesia to assess practical applicability of the CECM. The questionnaire relating to the CECM was used to collect data from staff members on the implementation of CE in their company. In order to obtain deeper findings about the perceived capability of contractors to implement CE, discussions with the participants were carried out as they filled out the questionnaires. These discussions were also used to gather feedback on the CECM in order to improve and refine the model.

8.3 IMPLICATIONS OF THE STUDY

This is the first study of CE for contractors. It succeeded in identifying 21 key factors of CE in the fabric of contractors' businesses, as well as a model to assess the capability of contractors to implement CE. These 21 key factors are categorized under five dimensions of CE as follows.

- Autonomy
  - ✓ Autonomy for accessing information
  - ✓ Autonomy for communication
  - ✓ Autonomy for proposing suggestions that benefit the projects and

company

- ✓ Autonomy in planning and managing projects

- Competitive aggressiveness
  - ✓ Acting as problem solver for clients
  - ✓ Being different compared with competitors
  - ✓ Building and maintaining client confidence in the company's trustworthiness and reliability
  - ✓ Maintaining relationship with clients
  - ✓ Positioning on markets that are concerned about quality
- Innovativeness
  - ✓ Carrying out research and development activities
  - ✓ Challenging staff to be innovative
  - ✓ Supporting programmes that spark innovation
- Proactiveness
  - ✓ Carrying out marketing activities
  - ✓ Expanding market segment
  - ✓ Looking ahead to future demands
  - ✓ Running business diversification
- Risk taking
  - ✓ Risk Taking for innovation
  - ✓ Risk taking for selecting clients
  - ✓ Risk taking on the financial aspects of projects
  - ✓ Risk taking on the social aspects of projects
  - ✓ Risk taking on the technical aspects of projects

The model to assess the capability of contractors to implement CE, named the CECM, and the procedures to implement it, were presented in Chapter 5.

The achievements of this study provide potential contributions to knowledge about contruction management, as well as practical implications for the construction industry. The following sections present the contribution of this study to construction related knowledge and the practical implications of this study for Indonesian construction contractors in particular.

8.3.1 Contribution to Knowledge

The study provides noteworthy contributions to knowledge in the areas of construction management as well as entrepreneurship.

First, the study contributes to construction management theory to fill the gap left by a lack of entrepreneurship research in the construction literature to date; moreover no study was found to consider CE in construction. The study provides theoretical concepts of entrepreneurship, with a specific focus on CE in construction and contractors, that were developed from the existing literature. Then a practical concept of corporate entrepreneurship for contractors was developed through the experiences of contractors in Indonesia; a concept that has been validated by a panel of 10 Indonesian experts. The 21 key factors of corporate entrepreneurship for contractors, and the CECM, represent a new discourse in construction management theory. The research findings offer a plausible detailed description of the implementation of CE in contractors' businesses and how to assess the capability of contractors in implementing CE.

Second, the study has expanded the boundaries of entrepreneurship theory. Research efforts on CE have developed rapidly and significantly, and have spread widely into a variety of disciplines; however, those efforts are yet to reach the construction field. The 21 key factors of CE for contractors revealed by this study provide a new repertoire of entrepreneurship and open broad opportunities for further study.

In addition, the study also expands the scope of the capability maturity model that has been developed to satisfy the need for a model that focuses on improving performance across several disciplines, but has not been explored in the discipline of entrepreneurship; specifically entrepreneurship in construction. The CECM that is generated by this study complements the model for assessing the capability or maturity level of company in particular issue of CE.

8.3.2 Practical Implication

The 21 key factors of corporate entrepreneurship and the CECM offer new insight into corporate entrepreneurship for practitioners in the contracting business, together

with their stakeholders. Stakeholders who are considered to have a particular interest in the results of this study are government agencies, professional associations of contractors and project owners or clients.

This study provides contractors a reference to implement CE and a tool to assess their entrepreneurial orientation. Furthermore, the assessment result has the potential to provide contractors with a foundation to develop a strategy which supports their business success. The government agencies and association of contractors have an interest to develop a comprehensive data base that describes the capability of contractors operating in Indonesia. Therefore the findings of this study provide the government agencies and association of contractors with a tool to assess the capability of contractors to implement CE. The findings of this study also provide the basis for the clients to assess the performance of the contractors who are chosen to build their projects, in order to make sure that they will not have any problems in cooperating with the contractors.

8.4 LIMITATIONS OF THE RESEARCH

Generally, all studies have certain limitations, and this study is no exception.

1. The key factors of CE in this study were investigated from the experiences of contractors in Indonesia; therefore they were influenced by the particular circumstances of each contractor's business environment in Indonesia. For this reason these key factors need modifications before they can be adopted by contractors in other countries.

2. The CECM considers each indicator provides a uniform contribution to the capability level of the contractor. However, different indicators can contribute different weights to the final capability level of contractors.

3. The questionnaire proposed in this study to assess the capability level of contractors to implement CE was developed by transferring the CECM in a direct way. The 21 indicators of the CECM were transferred into 21 questions; then four assessment criteria in each indicator were transferred into four alternative answers in each question. The way this questionnaire was developed could potentially generate biased data, because the purpose of each question could be easily identified by the

respondents.

4. The case studies were carried out with three major contracting companies in Indonesia; therefore, the case studies do not represent a range of different sized contractor companies in Indonesia.

8.5 RECOMMENDATIONS FOR FURTHER STUDY

This study has explored CE as a strategy to support contractors' businesses and has developed a model to assess entrepreneurial characteristics of contractors in Indonesia; and potentially contractors in other countries. During the study, several areas have been identified to be investigated further in the future. The potential research topics that can be studied further are listed below.

- To implement the CECM in a different country, or in a different project based industry, in order to identify the modification of the model as appropriate for the local conditions of the country or for the specific circumstances of the industry.

- To assess the entrepreneurial orientation of contractors in Indonesia, or another country, by assessing a large number of contractors using the CECM in order to develop a comprehensive data base that describes the strength(s) of contractors in Indonesia or in a particular country.

- To develop a comprehensive questionnaire as a tool to implement the CECM, which consists of questions that can be quantitatively measured.

- To determine the weight of each indicator in the CECM that contributed to the corporate entrepreneurship capability level of contractors; therefore allowing the capability levels of contactors to be assessed more precisely.

- To rank the level of importance of each key factor of CE. Under certain circumstances and with various limitations, it is not possible for contractors to make improvements in all aspects of corporate entrepreneurship; therefore, prioritization of the aspects that will be improved, is needed. In this situation, ranking the level of importance of each key factor of CE will help contractors to determine their priority settings.

REFERENCES

ABDUL-AZIZ, A.-R. & WONG, S. S. 2010. Exploring the Internationalization of Malaysian Contractors: the International Entrepreneurship Dimension. *Construction Management & Economics,* 28**,** 51-61.

ACAR, E. & GÖÇ, Y. 2011. Prediction of Risk Perception by Owners' Psychological Traits in Small Building Contractors. *Construction Management & Economics,* 29**,** 841-852.

ALAZZAZ, F. & WHYTE, A. 2015. Linking employee empowerment with productivity in off-site construction. *Engineering Construction & Architectural Management* 22**,** 21.

ALTINAY, L. 2005. The intrapreneur role of the development directors in an international hotel group. *Service Industries Journal,* 25**,** 403-419.

AMARATUNGA, D., SARSHAR, M. & BALDRY, D. 2002. Process improvement in facilities management: the SPICE approach. *Business Process Management Journal,* 8**,** 318.

ANDERSSON, J., BENGTSSON, F., EKMAN, J., LINDBERG, E., WALDEHORN, C. & NILSSON, F. 2011. Perception of innovation in companies - measuring the mindset of Tangible and Intangible Innovation in Companies. *2011 IEEE International Technology Management Conference (ITMC)***,** 532.

ANGKANANON, K., WALD, M. & GILBERT, L. Issues in Conducting Expert Validation and Review and User Evaluation of theTechnology Enhanced Interaction Framework and Method. The Eight International Conference on Internet and Web Applications and Services, 2013.

ANTONCIC, B. & HISRICH, R., D 2003. Clarifying the Intrapreneurship Concept. *Journal of Small Business & Enterprise Development,* 10**,** 7.

ANTONCIC, B. & SCARLAT, C. Corporate Entrepreneurship and Organizational Performance: a Comparison between Slovenia and Romania. 6th International Conference of the Faculty of Management Koper, 2005 Slovenia. 71 -89.

BARON, R. A. 2007. Behavioral and Cognitive Factors in Entrepreneurship: Entrepreneurs as the Active Element in New Venture Creation. *Strategic Entrepreneurship Journal,* 1**,** 167-182.

BARRETT, P. & SEXTON, M. 2006. Innovation in Small, Project-Based Construction Firms. *British Journal of Management,* 17**,** 331-346.

BARRETT, P., SEXTON, M. & LEE, A. 2008. *Innovation in Small Construction Firms,* Taylor and Francis.

BASSIONI, H. A., PRICE, A. D. & HASSAN, T. M. 2004. Performance Measurement in Construction. *Journal of Management in Engineering,* 20**,** 42-50.

BAZELEY, P. & JACKSON, K. 2013. *Qualitative Data Analysis with NVivo,* Los Angeles, SAGE.

BLAIKIE, N. 2010. *Designing Social Research,* Polity Press.

BLINDENBACH-DRIESSEN, F. & VAN DEN ENDE, J. 2006. Innovation in Project-Based Firms: the Context Dependency of Success Factors. *Research Policy,* 35**,** 545-561.

BOLTON & THOMPSON 2004. *Entrepreneurs : Talent, Temperament, Technique,* Elsevier.

BOSCH-SIJTSEMA, P. M. & POSTMA, T. J. B. M. 2009. Cooperative Innovation Projects: Capabilities and Governance Mechanisms. *Journal of Product Innovation Management,* 26**,** 58-70.

BOUGHZALA, I. 2014. A Community Maturity Model: a Field Application for Supporting New Strategy Building. *Journal of Decision Systems,* 23**,** 82-98.

BOUGHZALA, I. & DE VREEDE, G. J. A Collaboration Maturity Model: Development and Exploratory Application. Hawaii International Conference on System Sciences, 2012. New York, IEEE, 306-315.

BRANDSTÄTTER, H. 2011. Personality Aspects of Entrepreneurship: a Look at Five Meta-Analyses. *Personality and Individual Differences,* 51**,** 222-230.

BRAUN, V. & CLARKE, V. 2006. Using Thematic Analysis in Psychology. *Qualitative Research in Psychology,* 3**,** 77-101.

BROCKHAUS, S. R. H. 1980. Risk Taking Propensity of Entrepreneurs. *Academy of Management Journal,* 23**,** 509-520.

BRYMAN, A. & BELL, E. 2011. *Business Research Methods,* Oxford, Oxford University Press.

BUDIWIBOWO, A., TRIGUNARSYAH, B., ABIDIN, I. S. & SOEPARTO, H. G. 2009. Competitiveness of the Indonesian Construction Industry. *Journal of Construction in Developing Countries,* 14**,** 51-68.

BURGELMAN, R. A. 1983a. Corporate Entrepreneurship and Strategic Management: Insights from a Process Study. *Management Science,* 29**,** 1349-1364.

BURGELMAN, R. A. 1983b. A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly,* 28**,** 223-244.

BURGELMAN, R. A. 1984. Designs for Corporate Entrepreneurship In Established Firms. *California Management Review,* 26**,** 154-166.

BURNS, P. 2005. *Corporate Entrepreneurship : Building an Entrepreneurial Organisation,* Palgrave Macmillan.

CARLAND, J. W., HOY, F., BOULTON, W. R. & CARLAND, J. A. C. 1984. Differentiating Entrepreneurs from Small Business Owners: A Conceptualization. *Academy of Management Review,* 9**,** 354-359.

CHEN, C. & ORR, R. J. 2009. Chinese Contractors in Africa: Home Government Support, Coordination Mechanisms, and Market Entry Strategies. *Journal of Construction Engineering and Management,* 135**,** 1201-1210.

CHINOWSKY, P. S. 2001. Construction Management Practices Are Slowly Changing. *Leadership & Management in Engineering,* 1**,** 17.

CHRISTENSEN, K. S. 2005. Enabling Intrapreneurship: the Case of a Knowledge-Intensive Industrial Company. *European Journal of Innovation Management,* 8**,** 305-322.

COLLINS, C. J., HANGES, P. J. & LOCKE, E. A. 2004. The Relationship of Achievement Motivation to entrepreneurial Behavior: A Meta-Analysis. *Human Performance,* 17**,** 95-117.

COLLIS, J. & HUSSEY, R. 2003. *Business Research, A Practical Guide for Undergraduate and Postgraduate Students,* Palgrave Macmillan.

COVIN, J. G. & SLEVIN, D. P. 1989. Strategic Management of Small Firms in Hostile and Benign Environments. *Strategic Management Journal,* 10**,** 75-87.

COVIN, J. G. & SLEVIN, D. P. 1991. A Conceptual Model of Entrepreneurship as Firm Behavior. *Entrepreneurship: Theory & Practice,* 16**,** 7-25.

CRAIG, J. B., POHJOLA, M., KRAUS, S. & JENSEN, S. H. 2014. Exploring Relationships among Proactiveness, Risk-Taking and Innovation Output in Family and Non-Family Firms. *Creativity & Innovation Management,* 23**,** 199-210.

CRESWELL, J. W. 2003. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches,* Sage.

DAI, L., MAKSIMOV, V., GILBERT, B. A. & FERNHABER, S. A. 2014. Entrepreneurial orientation and international scope: The differential roles of innovativeness, proactiveness, and risk-taking. *Journal of Business Venturing,* 29**,** 511-524.

DE MASSIS, A., CHIRICO, F., KOTLAR, J. & NALDI, L. 2014. The Temporal Evolution of Proactiveness in Family Firms: The Horizontal S-Curve Hypothesis. *Family Business Review,* 27**,** 35 - 50.

DING, S., JIA, C., QU, B. & WU, Z. 2015. Corporate risk-taking: Exploring the effects of government affiliation and executives' incentives. *Journal of Business Research,* 68**,** 1196-1204.

DODD, S. D. & ANDERSON, A. R. 2007. Mumpsimus and the Mything of the Individualistic Entrepreneur. *International Small Business Journal,* 25**,** 341-360.

DOTZEL, T., SHANKAR, V. & BERRY, L. L. 2013. Service Innovativeness and Firm Value. *Journal of Marketing Research (JMR),* 50**,** 259-276.

DVIR, D., SADEH, A. & MALACH-PINES, A. 2006. Projects and Project Managers: the Relationship between Project Managers' Personality, Project Types, and Project Success. *Project Management Journal,* 37**,** 36-48.

EASTERBY, S., THORPE & JACKSON 2008. *Management research,* Sage, 2008. 3rd ed.

ELING, M. & MAREK, S. D. 2014. Corporate Governance and Risk Taking: Evidence from the U.K. and German Insurance Markets. *Journal of Risk & Insurance,* 81**,** 653-682.

FANG, D., LI, M., FONG, P. S. W. & SHEN, L. 2004. Risks in Chinese Construction Market-Contractors' Perspective. *Journal of Construction Engineering and Management,* 130**,** 853-861.

FAYOLLE, A., BASSO, O. & BOUCHARD, V. 2010. Three Levels of Culture and Firms' Entrepreneurial Orientation: A Research Agenda. *Entrepreneurship and Regional Development,* 22**,** 707-730.

FERRIER, W. J. 2001. Navigating the Competitive Landscape: the Drivers and Consequences of Competitive Aggressiveness. *Academy of Management Journal,* 44**,** 858-877.

FRANK, H., KESSLER, A. & FINK, M. 2010. Entrepreneurial Orientation and Business Performance: a Replication Study. *Schmalenbach Business Review (SBR),* 62**,** 175-198.

FRESE, M. 2009. Toward a Psychology of Entrepreneurship -an Action Theory Perspective. *Foundations and Trends in Entrepreneurship,* 5**,** 437-496.

FU, W. K., DREW, D. S. & LO, H. P. 2002. The Effect of Experience on Contractors' Competitiveness in Recurrent Bidding. *Construction Management & Economics,* 20**,** 655.

FU, W. K., DREW, D. S. & LO, H. P. 2003. Competitiveness of Inexperienced and Experienced Contractors in Bidding. *Journal of Construction Engineering & Management,* 129**,** 388.

GAMBATESE, J. A. & HALLOWELL, M. 2011. Factors that Influence the Development and Diffusion of Technical Innovations in the Construction Industry. *Construction Management & Economics,* 29**,** 507-517.

GANN, D. M. & SALTER, A. J. 2000. Innovation in Project-Based, Service-Enhanced Firms: the Construction of Complex Products and Systems. *Research Policy,* 29**,** 955-972.

GARTNER, W. B. 1988. "Who is an Entrepreneur?" Is the Wrong Question. *American Journal of Small Business,* 12**,** 11-32.

GARTNER, W. B., BIRD, B. J. & STARR, J. A. 1992. Acting As If: Differentiating Entrepreneurial From Organizational Behavior. *Entrepreneurship: Theory & Practice,* 16**,** 13-31.

GÖLGECI, I. & PONOMAROV, S. Y. 2015. How does firm innovativeness enable supply chain resilience? The moderating role of supply uncertainty and interdependence. *Technology Analysis and Strategic Management,* 27**,** 267-282.

GOULD, F. E. & JOYCE, N. E. 2009. *Construction Project Management,* Pearson Prentice-Hall.

GREEN, S. D., LARSEN, G. D. & CHUNG-CHIN, K. 2008. Competitive Strategy Revisited: Contested Concepts and Dynamic Capabilities. *Construction Management & Economics*, 26**,** 63-78.

GRÖTSCH, V. M., BLOME, C. & SCHLEPER, M. C. 2013. Antecedents of proactive supply chain risk management – a contingency theory perspective. *International Journal of Production Research,* 51**,** 2842-2867.

GUTH, W. D. & GINSBERG, A. 1990. Guest Editors' Introduction: Corporate Entrepreneurship. *Strategic Management Journal,* 11**,** 5-15.

HALPIN, D. W. & WOODHEAD, R. W. 1998. *Construction Management,* Wiley.

HAN, S. H., DIEKMANN, J. E. & OCK, J. H. 2005. Contractor's Risk Attitudes in the Selection of International Construction Projects. *Journal of Construction Engineering & Management,* 131**,** 283-292.

HAN, S. H., KIM, D. Y., JANG, H. S. & CHOI, S. 2010. Strategies for Contractors to Sustain Growth in the Global Construction Market. *Habitat International,* 34**,** 1-10.

HEBERT, R. F. & LINK, A. N. 1989. In Search of the Meaning of Entrepreneurship. *Small Business Economics,* 1**,** 39.

HELFAT, C. E. 1997. Know-How and Asset Complementarity and Dynamic Capability Accumulation: The Case of R&D. John Wiley and Sons.

HILLSON, D. A. 1997. Towards a Risk Maturity Model. *The International Journal of Project and Business Risk Management,* 1**,** 11.

HISRICH, R. D. 1990. Entrepreneurship/Intrapreneurship. *American Psychologist,* 45**,** 209-222.

HOBDAY, M. 2000. The project-based organisation: an ideal form for managing complex products and systems? *Research Policy,* 29**,** 871-893.

HOMBURG, C. & PRIGGE, J.-K. 2014. Exploring Subsidiary Desire for Autonomy: A Conceptual Framework and Empirical Findings. *Journal of International Marketing,* 22**,** 21-43.

HORNSBY, J. S., KURATKO, D. F. & ZAHRA, S. A. 2002. Middle Managers' Perception of the Internal Environment for Corporate Entrepreneurship: Assessing a Measurement Scale. *Journal of Business Venturing,* 17**,** 253-273.

HOSKISSON, R. E., COVIN, J., VOLBERDA, H. W. & JOHNSON, R. A. 2011. Revitalizing Entrepreneurship: The Search for New Research Opportunities. *Journal of Management Studies,* 48**,** 1141-1168.

HUGHES, M. & MORGAN, R. E. 2007. Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial Marketing Management,* 36**,** 651-661.

HUSSAIN, J., ISMAIL, K. & AKHTAR, C. S. 2015. Linking entrepreneurial orientation with organizational performance of small and medium sized enterprises: A conceptual approach. *Asian Social Science,* 11**,** 10p.

HUTCHINSON, A. & FINNEMORE, M. 1999. Standardized Process Improvement for Construction Enterprises. *Total Quality Management,* 10**,** S576.

IRELAND, R. D., COVIN, J. G. & KURATKO, D. F. 2009. Conceptualizing Corporate Entrepreneurship Strategy. *Entrepreneurship Theory and Practice,* 33**,** 19-46.

JAAFAR, M., OTHMAN, R. & JALALI, A. 2014. Main Determinations of Female Entrepreneurs in the Construction Industry in Malaysia. *Project Management Journal,* 45**,** 11.

JENNINGS, D. F. & LUMPKIN, J. R. 1989a. Functioning Modeling Corporate Entrepreneurship - an Empirical Integrative Analysis. *Journal of Management* 15**,** 485-502.

JENNINGS, D. F. & LUMPKIN, J. R. 1989b. Functioning Modeling Corporate Entrepreneurship - an Empirical Integrative Analysis. *Journal of Management,* 15**,** 485-502.

JEONG, K., SIRIWARDENA, M., HAIGH, R., AMARATUNGA, R. & KAGIOGLOU, M. 2004. Structured process improvement for construction enterprises (SPICE) level 3: Establishing a management infrastructure to facilitate process improvement at an organisational level. Salford Centre for Research and Innovation in the Built and Human Environment.

JIRAPORN, P., CHATJUTHAMARD, P., TONG, S. & KIM, Y. S. 2015. Does corporate governance influence corporate risk-taking? Evidence from the Institutional Shareholders Services (ISS). *Finance Research Letters,* 13**,** 105-112.

JOHNSON, K. L. 2012. The Role of Structural and Planning Autonomy in the Performance of Internal Corporate Ventures. *Journal of Small Business Management,* 50**,** 469-497.

JONES, G. R. & BUTLER, J. E. 1992. Managing Internal Corporate Entrepreneurship: an Agency Theory Perspective. *Journal of Management,* 18**,** 733-749.

JOSHI, M. P., DAS, S. R. & MOURI, N. 2015. Antecedents of innovativeness in technology-based services (TBS): Peering into the black box of entrepreneurial orientation. *Decision Sciences,* 46**,** 367-402.

JUNG, W., HAN, S. H., PARK, H. & KIM, D. Y. 2010. Empirical Assessment of Internationalization Strategies for Small and Medium Construction Companies. *Journal of Construction Engineering and Management - ASCE,* 136**,** 1306-1316.

KANAGARETNAM, K., CHEE YEOW, L. & LOBO, G. J. 2014. Influence of National Culture on Accounting Conservatism and Risk-Taking in the Banking Industry. *Accounting Review,* 89**,** 1115-1149.

KANTER, R. M. 2004. The Middle Manager as Innovator. *Harvard Business Review,* 82**,** 150-161.

KIM, H. J. & REINSCHMIDT, K. F. 2011a. Association of Risk Attitude with Market Diversification in the Construction Business. *Journal of Management in Engineering,* 27**,** 66-74.

KIM, H. J. & REINSCHMIDT, K. F. 2011b. Effects of Contractors' Risk Attitude on Competition in Construction. *Journal of Construction Engineering & Management,* 137**,** 275-283.

KIM, Y. 2010. Improving Performance in US State Governments Risk-Taking, Innovativeness, and Proactiveness Practices. *Public Performance and Management Review,* 34**,** 104 - 139.

KIRZNER, I. M. 1997. Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *Journal of Economic Literature,* 35**,** 60-85.

KOH, H. C. 1996. Testing Hypotheses of Entrepreneurial Characteristics: a Study of Hong Kong MBA Students. *Journal of Managerial Psychology,* 11**,** 12-25.

KORKMAZ, S. & MESSNER, J. I. 2008. Competitive Positioning and Continuity of Construction Firms in International Markets. *Journal of Management in Engineering,* 24**,** 207-216.

KREISER, P., MARINO, L., DAVIS, J., TANG, Z. H. I. & LEE, C. 2010a. Firm-Level Entrepreneurship: the Role of Proactiveness, Innovativeness and Strategic Renewal in the Creation and Exploration of Opportunities. *Journal of Developmental Entrepreneurship,* 15**,** 143-163.

KREISER, P. M., MARINO, L. D., DICKSON, P. & WEAVER, K. M. 2010b. Cultural influences on entrepreneurial orientation: the impact of national culture on risk taking and proactiveness in SMEs. *Entrepreneurship: Theory and Practice***,** 959.

KURATKO, D. F., MONTAGNO, R. V. & HORNSBY, J. S. 2005. Developing an Intrapreneurial Assessment Instrument for an Effective Corporate Entrepreneurial Environment. *Corporate Entrepreneurship and Growth***,** 59-68.

KWAK, Y. H. & IBBS, C. W. 2002. Project Management Process Maturity (PM)^2 Model. *Journal of Management in Engineering,* 18**,** 150.

LARASATI ZR, D. & TSUNEMI, W. 2009. Evaluation Study on Existing Condition of Indonesia Construction Industry : How to Improve Performance and the Competitiveness. *International Seminar of Society for Social Management System (SSMS).* Kochi, Japan.

LAZEAR, E. P. 2005. Entrepreneurship. *Journal of Labor Economics,* 23**,** 649-680.

LEVY, S. M. 2002. *Project Management in Construction,* McGraw-Hill.

LI, K., GRIFFIN, D., YUE, H. & ZHAO, L. 2013. How does culture influence corporate risk-taking? *Journal of Corporate Finance,* 23**,** 1-22.

LIM, J. N., SCHULTMANN, F. & OFORI, G. 2010. Tailoring Competitive Advantages Derived from Innovation to the Needs of Construction Firms. *Journal of Construction Engineering & Management,* 136**,** 568-580.

LIN, H.-C. Building Competitive Advantage: the Roles of Upper Echelons and Competitive Aggressiveness. 2006/08// 2006. Academy of Management, Y1-Y6.

LIU, T. C. & CHEN, Y. J. 2015. Strategy orientation, product innovativeness, and new product performance. *Journal of Management and Organization,* 21**,** 2-16.

LOCKAMY III, A. & MCCORMACK, K. 2004. The Development of a Supply Chain Management Process Maturity Model Using the Concepts of Business Process Orientation. *Supply Chain Management,* 9**,** 272-278.

LUCHSINGER, V. & RAY BAGBY, D. 1987. Entrepreneurship and Intrapreneurship: Behaviors, Comparisons, and Contrasts. *SAM Advanced Management Journal,* 52**,** 10-13.

LUMPKIN, G. T., COGLISER, C. C. & SCHNEIDER, D. R. 2009. Understanding and Measuring Autonomy: An Entrepreneurial Orientation Perspective. *Entrepreneurship Theory and Practice,* 33**,** 47-69.

LUMPKIN, G. T. & DESS, G. G. 1996. Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. *Academy of Management Review,* 21**,** 135-172.

LUMPKIN, G. T. & DESS, G. G. 2001. Linking two Dimensions of Entrepreneurial Orientation to Firm Performance. the Moderating Role of Environment and Industry Life Cycle. *Journal of Business Venturing,* 16**,** 429-451.

MARTIARENA, A. 2013. What's So Entrepreneurial About Intrapreneurs? *Small Business Economics,* 40**,** 27-39.

MCCALL, J. J. 2001. Employee Voice in Corporate Governance: a Defense of Strong Participantion Rights. *Business Ethics Quarterly,* 11**,** 195-213.

MCCLELLAND 1961. *The achieving society,* Free P., 1961.

MENG, X., MING, S. & JONES, M. 2011. Maturity Model for Supply Chain Relationships in Construction. *Journal of Management in Engineering,* 27**,** 97-105.

MILLER, D. 1983. The Correlates of Entrepreneurship in Three Types of Firms. *Management Science,* 29**,** 770-791.

MILLER, D. & FRIESEN, P. H. 1982. Innovation in Conservative and Entrepreneurial Firms: Two Models of Strategic Momentum. *Strategic Management Journal,* 3**,** 1.

MITRA, S., DHAR, S. & AGRAWAL, K. M. 2008a. Assessment of Corporate Environmental Proactiveness. *South Asian Journal of Management,* 15**,** 101-135.

MITRA, S., DHAR, S. & AGRAWAL, K. M. 2008b. Environmental Proactiveness. *Journal of Management Research (09725814),* 8**,** 96-111.

MOHAMAD, O., RAMAYAH, T., PUSPOWARSITO, H., NATALISA, D. & SAERANG, D. P. E. 2011. Corporate Entrepreneurship and Firm Performance: The Role of Business Environment as a Moderator. *Journal of Management Research,* 10**,** 7-27.

MOON, M. J. 1999. The Pursuit of Managerial Entrepreneurship: Does Organization Matter? *Public Administration Review,* 59**,** 31-43.

NAM, C. H. & TATUM, C. B. 1997. Leaders and Champions for Construction Innovation. *Construction Management & Economics,* 15**,** 259-270.

NIGHTINGALE, D. J. & MIZE, J. H. 2002. Development of a Lean Enterprise Transformation Maturity Model. *Information Knowledge Systems Management,* 3**,** 15.

OPPENHEIM, A. N. 1992. *Questionnaire Design, Interviewing and Attitude Measurement,* Pinter.

OROZCO, F. A., SERPELL, A. F., MOLENAAR, K. R. & FORCAEL, E. 2014. Modeling Competitiveness Factors and Indexes for Construction Companies: Findings of Chile. *Journal of Construction Engineering and Management,* 140.

ÖZDEMIRCI, A. 2011. Corporate Entrepreneurship and Strategy Process: A Performance Based Research on Istanbul Market. *Procedia - Social and Behavioral Sciences,* 24**,** 611-626.

PAMULU, S. P. 2010. *Strategic Management Practices in the Construction Industry: a Study of Indonesian Enterprises.* Queensland University of Technology.

PAULK, M. C., CURTIS, B., CHRISSIS, M. B. & WEBER, C. V. 1993. Capability Maturity Model[SM] for Software, Version 1.1. Pittsburgh, Pennsylvania: Carnegie Mellon University.

PELLICER, E., YEPES, V., CORREA, C. L. & ALARCÓN, L. F. 2014. Model for Systematic Innovation in Construction Companies. *Journal of Construction Engineering & Management,* 140**,** -1.

PELLICER, E., YEPES, V. & ROJAS, R. J. 2010. Innovation and Competitiveness in Construction Companies. *Journal of Management Research* 10**,** 103-115.

PELTOLA, S. 2012. Can an Old Firm Learn New Tricks? a Corporate Entrepreneurship Approach to Organizational Renewal. *Business Horizons,* 55**,** 43-51.

PHUA, F. T. T. 2012. Do national cultural differences affect the nature and characteristics of HRM practices? Evidence from Australian and Hong Kong construction firms on remuneration and job autonomy. *Construction Management & Economics,* 30**,** 545-556.

PINCHOT, G. 1986. *Intrapreneuring : Why You Don't Have to Leave the Corporation to Become an Entrepreneur*, Harper and Row.

QUINLAN 2011. *Business Research Methods*, Cengage.

RAMIREZ, C. 2002. Strategies Review in Questionnaire Design. *Question Desing, Evaluation and Testing Conference.* Charleston, SC.

RITZ, G. J. 1994. *Total Construction Project Management*, McGraw-Hill.

ROBSON, C. 2002. *Real World Research : a Resource for Social Scientists and Practitioner-Researchers* Blackwell.

ROGLINGER, M., PO¨PPELBUß, J. & BECKER, J. R. 2012. Maturity Models in Business Process Management. *Business Process Management Journal,* 18**,** 328 - 346.

ROLOFF, J. & ABLÄNDER, M. S. 2010. Corporate Autonomy and Buyer—Supplier Relationships: The Case of Unsafe Mattel Toys. Springer.

ROSS, J. 1987. Corporations and Entrepreneurs: Paradox and Opportunity. *Business Horizons,* 30**,** 76.

ROSS, J. E. & UNWALLA, D. 1986. Who is an Intrapreneur? *Personnel,* 63**,** 45-49.

SANDBERG, B. 2007. Customer-related proactiveness in the radical innovation development process. *European Journal of Innovation Management,* 10**,** 252-267.

SARSHAR, M., HAIGH, R., FINNEMORE, M., AOUAD, G., BARRETT, P., BALDRY, D. & SEXTON, M. 2000. SPICE: a Business Process Diagnostics Tool for Construction Projects. *Engineering Construction & Architectural Management* 7**,** 241.

SAUNDERS, M., LEWIS, P. & THORNHILL, A. 2012. *Research Methods for Business Students,* Pearson.

SCHAUFELBERGER, J. 2009. *Construction Business Management,* Prentice-Hall.

SCHENDEL, D. 1990. Introduction to the Special Issue on Corporate Entrepreneurship. *Strategic Management Journal,* 11**,** 1-3.

SCHUMPETER 1939. *Business Cycles: a Theoretical, Historical and Statistical Analysis of the Capitalist Process. Vol. 1-2 / by J.A. Schumpeter,* McGraw-Hill.

SEXTON & LANDSTROM 2000. *The Blackwell Handbook of Entrepreneurship / edited by Donald L. Sexton and Hans Landstrom,* Blackwell.

SHARMA, P. & CHRISMAN, J. J. 1999. Toward a Reconciliation of the Definitional Issues in the Field of Corporate Entrepreneurship. *Entrepreneurship: Theory & Practice,* 23**,** 11-27.

SIDEK, S. & ZAINOL, F. A. 2011. Psychological Traits and Business Performance of Entrepreneurs in Small Construction Industry in Malaysia. *International Business & Management,* 2**,** 170.

SILVERMAN, D. 2011. *Intrepreting Qualitative Data,* London, Sage Publications Ltd.

SÖDERBERG, L. & BENGTSSON, L. 2010. Supply Chain Management Maturity and Performance in SMEs. *Operations Management Research,* 3**,** 90-97.

SOEPARTO, H. G., SOEPANDJI, B. S., ABIDIN, I. & TRIGUNARSYAH, B. 2007. Long term Indonesian construction industry's aggregate productivity simulation considering overall business environment. *Fourth International Conference on*

Construction in the 21st Century - Accelerating Innovation in Engineering, Management and Technology. Gold Coast, Australia.

SPENCER, A. S., KIRCHHOFF, B. A. & WHITE, C. 2008. Entrepreneurship, Innovation, and Wealth Distribution - the Essence of Creative Destruction. *International Small Business Journal,* 26**,** 9-26.

SRIVASTAVA, N. & AGRAWAL, A. 2010. Factors Supporting Corporate Entrepreneurship: an Exploratory Study. *The Journal of Business Perspective,* 14**,** 163-171.

STEWART, P. J. 2000. *Strategic IT Maturity of Construction Companies.* Doctor of Philosophy, Royal Melbourne Institute of Technology.

STEWART, W. H. & ROTH, P. L. 2007. a Meta-Analysis of Achievement Motivation Differences Between Entrepreneurs and Managers. *Journal of Small Business Management,* 45**,** 401-421.

STRAUSS & CORBIN 2008. *Basics of Qualitative Research : Techniques and Procedures for Developing Grounded Theory*, Sage.

SUDARTO, S., ABIDIN, I., TRIGUNARSYAH, B. & RIANTINI, L. S. 2008a. The Influence of Market Forces to Construction Companies's Performance in Indonesia *Eleventh East Asia-Pacific Conference on StructuralEngineering & Construction (EASEC-11) "Building a Sustainable Environment".* Taipei, Taiwan.

SUDARTO, S., BAMBANG, T. & ISMETH, A. 2007. Lesson learned corrective action in internal factors of construction company in Indonesia. *Fourth International Conference on Construction in the 21st Century - Accelerating Innovation in Engineering, Management and Technology.* Australia.

SUDARTO, S., TRIGUNARSYAH, B., ABIDIN, I. S. & SOEPANDJI, B. S. 2008b. Identification of the Cause of External Factor Problems that Influence Construction Company's Performance in Indonesia. *4th International Structural Engineering and Construction Conference (ISEC-4).* Melbourne, Australia.

SUN, M. & OZA, T. 2008. Improving NEC Contract Change Management with CCM. *CCM Report.* Bristol: University of the West England.

SURAJI, A., TAMIN, R. Z., WIBOWO, M. A., SOEPARTO, H. G., TRIGUNARSYAH, B. & SOEMARDI, B. W. 2007. *Konstruksi Indonesia 2030 untuk kenyamanan lingkungan terbangun,* Jakarta, Indonesia, Lembaga Pengembangan Jasa Konstruksi Nasional (LPJKN).

TAJEDDINI, K. & MUELLER, S. L. 2009. Entrepreneurial Characteristics in Switzerland and the UK: a Comparative Study of Techno-entrepreneurs. *Journal of International Entrepreneurship,* 7**,** 1-25.

TAN, Y., SHEN, L. & LANGSTON, C. 2010. Contractors' Competition Strategies in Bidding: Hong Kong Study. *Journal of Construction Engineering & Management,* 136**,** 1069-1077.

TANG, J., TANG, Z. & KATZ, J. A. 2014. Proactiveness, Stakeholder-Firm Power Difference, and Product Safety and Quality of Chinese SMEs. *Entrepreneurship: Theory & Practice,* 38**,** 1129-1157.

TANG, Z., KREISER, P. M., MARINO, L., DICKSON, P. & WEAVER, K. M. 2009. A hierarchical perspective of the dimensions of entrepreneurial orientation. *International Entrepreneurship and Management Journal,* 5**,** 181-201.

TEAM, C. P. 2010. CMMI for Development, Version 1.3. Software Engineering Institute, Carnegie Mellon University.

THORNBERRY, N. 2006. Lead Like an Entrepreneur: Keeping the Entrepreneurial Spirit Alive within the Corporation. New York: McGraw-Hill.

TICEHURST, G. W. & VEAL, A. J. 2011. *Business Research Methods a Managerial Approach,* Longman.

TSAI, K. H., LIAO, Y. C. & HSU, T. T. 2015. Does the use of knowledge integration mechanisms enhance product innovativeness? *Industrial Marketing Management,* 46**,** 214-223.

TSAI, M. T., CHUANG, S. S. & HSIEH, W. P. Using Analytic Hierarchy Process To Evaluate Organizational Innovativeness In High-Tech Industry. Decision Sciences Institute 2008 Annual Meeting, 2008 Baltimore Maryland USA

TUULI, M. M. & ROWLINSON, S. 2009. Performance Consequences of Psychological Empowerment. *Journal of Construction Engineering & Management,* 135**,** 1334-1347.

TUULI, M. M., ROWLINSON, S. & TAS, Y. K. 2010a. Control modes and mechanisms in construction project teams: drivers and consequences. *Construction Management and Economics,* 28**,** 451-465.

TUULI, M. M., ROWLINSON, S. & TAS YONG, K. O. H. 2010b. Dynamics of control in construction project teams. *Construction Management & Economics,* 28**,** 189-202.

VAN GELDEREN, M., JANSEN, P. & JONGES, S. 2003. The multiple sources of autonomy as a startup motive. *SCALES-paper N200315.* Zoetermeer: Erasmus University Rotterdam.

VAN WYK, R. & ADONISI, M. 2012. Antecedents of Corporate Entrepreneurship. *South African Journal of Business Management,* 43**,** 65-78.

VEZZETTI, E., VIOLANTE, M. G. & MARCOLIN, F. 2014. A Benchmarking Framework for Product Lifecycle Management (PLM) Maturity Models. *The International Journal of Advanced Manufacturing Technology***,** 899.

VOLBERDA, H. W. 1998. Building the Flexible Firm : How to Remain Competitive. Oxford.

VOLPE, P. & VOLPE, P. J. 1991. *Construction Business Management*, Wiley.

WANG, J. & YUAN, H. 2011. Factors Affecting Contractors' Risk Attitudes in Construction Projects: Case Study from China. *International Journal of Project Management,* 29**,** 209-219.

WIDJAJANTO, A., PRIBADI, K. S. & SURAJI, A. 2011. The Construction Sector of Indonesia. *17th Asia Construct Conference.* New Delhi, India.

WIENGARTEN, F., FYNES, B., CHENG, E. T. C. & CHAVEZ, R. 2013. Taking an innovative approach to quality practices: exploring the importance of a company's innovativeness on the success of TQM practices. *International Journal of Production Research,* 51**,** 3055-3074.

WIKLUND, J. & SHEPHERD, D. 2003. Knowledge-Based Resources, Entrepreneurial Orientation, and the Performance of Small and Medium-Sized Businesses. *Strategic Management Journal,* 24**,** 1307-1314.

WIKLUND, J. & SHEPHERD, D. 2005. Entrepreneurial Orientation and Small Business Performance: a Configurational Approach. *Journal of Business Venturing,* 20**,** 71-91.

WILLIS, C. J. & RANKIN, J. H. 2012. The Construction Industry Macro Maturity Model (CIM3): Theoretical Underpinnings. *International Journal of Productivity & Performance Management,* 61**,** 382-402.

WINCH, G. M. 2000. Innovativeness in British and French Construction: the Evidence from Transmanche-Link. *Construction Management & Economics,* 18**,** 807-817.

WINCH, G. M. 2010. *Managing Construction Projects : an Information Processing Approach*, Wiley-Blackwell.

WIRAHADIKUSUMAH, R. D. & PRIBADI, K. S. 2011. Licensing Construction Workforce: Indonesia's Effort on Improving the Quality of National Construction Industry. *Engineering Construction and Architectural Management,* 18**,** 431-443.

WONG, J. M. W., NG , S. T. & CHAN, A. P. C. 2010. Strategic Planning for the Sustainable Development of the Construction Industry in Hong Kong. *Habitat International,* 34**,** 256 - 263.

WONG, J. T. Y. & HUI, E. C. M. 2006. Construction Project Risks: Further Considerations for Constructors' Pricing in Hong Kong. *Construction Management & Economics,* 24**,** 425-438.

XIAO-HUA, J. & LING, F. Y. Y. 2005. Model for Fostering Trust and Building Relationships in China's Construction Industry. *Journal of Construction Engineering & Management,* 131**,** 1224-1232.

YALCIN, S. & KAPU, H. 2008. Entrepreneurial Dimensions in Transitional Economies: a Review of Relevant Literature and the Case of Kyrgyzstan. *Journal of Developmental Entrepreneurship,* 13**,** 185-204.

YIN, R. K. 2009. *Case Study Research : Design and Methods,* Los Angeles, Sage Publications.

ZAHRA, S. A. 1993. A Conceptual Model of Entrepreneurship as Firm Behavior: A Critique and Extension. *Entrepreneurship: Theory & Practice,* 17**,** 5-21.

ZAHRA, S. A. 1996. Goverance, Ownership, and Corporate Entrepreneurship: The Moderating Impact of Industry Technological Opportunities. *Academy of Management Journal,* 39**,** 1713-1735.

ZAHRA, S. A. & COVIN, J. G. 1995. Contextual Influences on the Corporate Entrepreneurship-Performance Relationship: a Longitudinal Analysis. *Journal of Business Venturing,* 10**,** 43-58.

ZAHRA, S. A. & GARVIS, D. M. 2000. International Corporate Entrepreneurship and Firm Performance: the Moderating Effect of International Environmental Hostility. *Journal of Business Venturing,* 15**,** 469-492.

ZHAO, Z. Y. & SHEN, L. Y. 2008. Are Chinese Contractors Competitive in International Markets? *Construction Management & Economics,* 26**,** 225-236.

ZOU, P. X. W., YING, C. & TSZ-YING, C. 2010. Understanding and Improving Your Risk Management Capability: Assessment Model for Construction Organizations. *Journal of Construction Engineering & Management,* 136**,** 854-863.

ZOU, P. X. W., ZHANG, G. & WANG, J.-Y. 2014. Identifying Key Risks in Construction Projects: Life Cycle and Stakeholder Perspectives. *International Journal of Construction Management* 9.